1985 ANNUAL TROPICAL CYCLONE REPORT

JOINT TYPHOON
WARNING CENTER
GUAM, MARIANA ISLANDS

FRONT COVER: Typhoon Odessa (above right) as viewed through the cargo bay of the NASA Space Shuttle. The cloudiness at the lower right is associated with Typhoon Pat. Odessa and Pat, along with Skip, Ruby and Tess, became part of the single most active tropical cyclone day during the the 1985 northwestern Pacific season, when all five systems existed at the same time. At picture time, 2822207 August 1985, the Shuttle was passing eastward across the position 24.1N latitude 143.4E longitude (NASA slide #35-078 provided by CDR D.A. Mautrer, OIC NAVPOLAROCEANCEN Detachment, Johnson Space Center, Texas).

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FOREWORD

The Annual Tropical Cyclone Report is prepared by the staff of the Joint Typhoon Warning Center (JTWC), a combined USAF/USN organization operating under the command of the Commanding Officer, U.S. Naval Oceanography Command Center/Joint Typhoon Warning Center, Guam. JTWC was established in April 1959 when USCINCPAC directed USCINCPACFIIT to provide a single tropical cyclone warning center for the western North Pacific region. The operations of JTWC are guided by CINCPACINST 3140.1 (series).

The mission of the Joint Typhoon Warning Center is multi-faceted and includes:

- 1. Continuous monitoring of all tropical weather activity in the Northern and Southern Hemispheres, from 180 degrees longitude westward to the east coast of Africa, and the prompt issuance of appropriate advisories and alerts when tropical cyclone development is anticipated.
- Issuing warnings on all significant tropical cyclones in the above area of responsibility.
- 3. Determination of reconnaissance requirements for tropical cyclone surveillance and assignment of appropriate priorities.
- 4. Post-storm analysis of all significant tropical cyclones occurring within the western North Pacific and North Indian Oceans, which includes an in-depth analysis of tropical cyclones of note and all typhoons. Also for the first time a summary of the South Pacific and South Indian Ocean significant tropical cyclones for the period 1 July 1984 through 30 June 1985 are included.
- 5. Cooperation with the Naval Environmental Prediction Research Facility, Monterey, California, on the operational evaluation of tropical cyclone models and forecast aids, and the development of new techniques to support operational forecast scenarios.

Satellite imagery used throughout this report represents data obtained by the tropical cyclone satellite surveillance network. The personnel of Detachment 1, lWW, collocated with JTWC at Nimitz

Hill, Guam, coordinate the satellite acquisitions and tropical cyclone surveillance with the following units:

Det 4, 20WS, Hickam AFB, Hawaii

Det 5, 20WS, Clark AB, RP

Det 8, 20WS, Kadena AB, Japan

Det 15, 30WS, Osan AB, Korea

Air Force Global Weather Central, Offutt AFB, Nebraska

In addition, the Naval Oceanography Command Detachment, Diego Garcia, and DMSP equipped U.S. Navy aircraft carriers have been instrumental in providing vital satellite position fixes of tropical cyclones in the Indian Ocean.

Should JTWC become incapacitated, the Alternate Joint Typhoon Warning Center (AJTWC) located at the U.S. Naval Western Oceanography Center, Pearl Harbor, Hawaii, assumes warning responsibilities. Assistance in determining satellite reconnaissance requirements, and in obtaining the resultant data, is provided by Det 4, 20WS Hickam AFB, Hawaii.

A special thanks is extended to the men and women of: 27th Information Systems Squadron, Operating Location C, for their continuing support by providing high quality real-time satellite imagery; the Pacific Fleet Audio-Visual Center, Guam, for their assistance in the reproduction of satellite and graphics data for this report; to the Navy Publications and Printing Service Branch Office, Guam, for their efforts to meet deadlines; and to AG3 S. A. Murdock for typing the many drafts and assistance with the final manuscript of this report. Thanks is also extended to Lt. G. H. Carpenter and Lt. R. A. Wimmer for submitting Tropical Cyclone write-ups on Typhoon Tess and Typhoon Kit respectively. A special thanks to TSGT W. H. Taylor for gridding the numerous satellite images for this report and to Mrs. Leah M. Foster of the Xerox Corporation, Guam for her assistance with the preparation of the script font portions of this document.

Note:

Appendix IV contains information on how to obtain past issues of the <u>Annual Tropical Cyclone Report</u> (titled <u>Annual Typhoon Report</u> prior to 1980).

TABLE OF CONTENTS

		OPERATIONAL PRO	EDURES			PAGE
						- 1
		Communication	ons			- 1
		Prognostic I	Reasoning M	essages		- 3
				tion Alert		
	10	0. Significant	Tropical W	eather Advisory -		- 3
CHAPTER	II I	RECONNAISSANCE A	AND FIXES			
				ility		
	:	 Aircraft Rec 	connaissanc	e Summary		- 5
		4. Satellite Re	econnaissan	ce Summary		- 5
	!	5. Radar Reconi	naissance S	ummary		- 7
	(6. Tropical Cyc	clone Fix D	ata		- 7
CHAPTER	III 8	SUMMARY OF WEST	ERN NORTH P	ACIFIC AND NORTH	INDIAN OCEAN	
		TROPICAL CYCLONE				
		l. General				- 11
	:	2. Western Nort	th Pacific '	Propical Cyclones		- 11
		INDIVID	AL TROPICA	L CYCLONES		
TROPICAL	CYCLONE	AUTHOR 1	PAGE	TROPICAL CYCLONE	AUTHOR P	AGE
(01W) TS						
	RISTR	WIREEL	18	(02C) TO SKIP	CINZELMAN -	74
		WIRFEL		(02C) TY SKIP (15W) TY TESS	GUNZELMAN -	
(02W) TS	FABIAN	GILFORD	20	(15W) TY TESS	CARPENTER -	76
(02W) TS	FABIAN GAY	GILFORD GUNZELMAN -	20 22	(15W) TY TESS (16W) TS VAL	Carpenter - Shoemake -	76 80
(02W) TS (03W) TY (04W) TD	FABIAN GAY 04	GILFORD GUNZELMAN - COLUMBUS	20 22 26	(15W) TY TESS (16W) TS VAL (17W) TS WINONA	CARPENTER - SHOEMAKE - DYE	76 80 82
(02W) TS	FABIAN GAY 04 HAL	GILFORD GUNZELMAN -	20 22 26 28	(15W) TY TESS (16W) TS VAL (17W) TS WINONA (18W) TY ANDY	CARPENTER - SHOEMAKE - DYE GATANIS	76 80 82 84
(02W) TS (03W) TY (04W) TO (05W) TY (06W) TY	FABIAN GAY 04 HAL IRMA	GILFORD GUNZELMAN - COLUMBUS COLUMBUS SHOEMAKE	20 22 26 28 34	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA	CARPENTER - SHOEMAKE - DYE GATANIS MCNAMARA -	76 80 82 84 86
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (07W) TY	FABIAN GAY 04 HAL IRMA JEFF	GILFORD GUNZELMAN - COLUMBUS COLUMBUS	20 22 26 28 34 38	(15W) TY TESS (16W) TS VAL (17W) TS WINONA (18W) TY ANDY (19W) TY ERENDA (20W) TY CECIL	CARPENTER - SHOEMAKE - DYE GATANIS MCNAMARA - DYE	76 80 82 84 86 90
(02W) TS (03W) TY (04W) TO (05W) TY (06W) TY	FABIAN GAY O4 HAL IRMA JEFF	GILFORD GUNZELMAN COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER	20 22 26 28 34 38 42	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS -	76 80 82 84 86 90
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (07W) TY (08W) TY (09W) TS	FABIAN GAY 04 HAL IRMA JEFF KIT LEE	GILFORD GUNZELMAN - COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN - WILLIAMS	20 22 26 28 34 38 42 46 52	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY BRENDA (20W) TY CECIL (21W) STY DOT	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS -	76 80 82 84 86 90 92 100
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (07W) TY (08W) TY (09W) TS	FABIAN GAY 04 HAL IRMA JEFF KIT LEE	GILFORD GUNZELMAN - COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN - WILLIAMS	20 22 26 28 34 38 42 46 52	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS	76 80 82 84 86 90 92 100
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (07W) TY (08W) TY (09W) TS (10W) TY	GAY 04 HAL IRMA JEFF KIT LEE MAMIE	GILFORD GUNZELMAN - COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN -	20 22 26 28 34 38 42 46 52 54	(15W) TY TESS (16W) TS VAL (17W) TS WINDOWA (18W) TY ANDY (19W) TY BRENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS	76 80 82 84 86 90 92 100 106 108
(02W) TS (03W) TY (04W) TD (05W) JY (06W) TY (07W) TY (08W) TY (10W) TS (10W) TY (11W) TY	FABIAN GAY 04 HAL IRMA JEFF KIT LIEE MAMIE NELSON ODESSA	GILFORD GUNZELMAN - COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN - WILLIAMS SHOEMAKE	20 22 26 28 34 38 42 46 52 54 58	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE (24W) TS GORDON	CARPENTER - SHOEMAKE DYE GATANIS MCNAMARA DYE COLUMBUS WILLIAMS GATANIS SHOEMAKE COLUMBUS	76 80 82 84 86 90 92 100 106 108 110
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (07W) TY (08W) TS (10W) TS (10W) TY (11W) TY (12W) TY	FABIAN GAY 04 HAL IRMA JEFF KIT LEE MAMIE NELSON ODESSA PAT	GILFORD GUNZEIMAN COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZEIMAN WILLIAMS SHOEMAKE WELLS WHATER WILLIAMS WHATER WHATER WELLS	20 22 26 28 34 38 42 46 52 54 58 64	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY BRENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE	CARPENTER - SHOEMAKE DYE GATANIS MCNAMARA DYE COLUMBUS WILLIAMS GATANIS SHOEMAKE COLUMBUS	76 80 82 84 86 90 92 100 106 108 110
(02W) TS (03W) TY (04W) TD (05W) JTY (06W) TY (07W) TY (08W) TS (10W) TS (11W) TY (11W) TY (12W) TY (13W) TY	FABIAN GAY 04 HAL IRMA JEFF KIT LEE MAMIE NELSON ODESSA PAT RUBY	GILFORD GUNZELMAN - COLUMBUS SHOEMAKE WELLS GUNZELMAN - WILLIAMS SHOEMAKE WELLS GUNZELMAN - GUNZELMAN - GUNZELMAN -	20 22 26 28 34 38 42 46 52 54 58 64	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY BRENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS - SHOEMAKE - COLUMBUS - WILLIAMS - WILLIAMS -	76 80 82 84 86 90 92 100 106 108 110
(02W) TS (03W) TY (04W) TD (05W) JTY (06W) TY (07W) TY (08W) TS (10W) TS (11W) TY (11W) TY (12W) TY (13W) TY	FABIAN GAY 04 HAL IRMA JEFF KIT LEE MAMIE NELSON ODESSA PAT RUBY	GILFORD GUNZELMAN COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN WILLIAMS WILLIAMS WELLS GILFORD GUNZELMAN WELLS GILFORD GUNZELMAN SHOEMAKE WELLS GILFORD GUNZELMAN SHOEMAKE WELLS GUNZELMAN GUNZELMAN 3. North Indian	20 22 26 28 34 38 42 46 52 54 58 64	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA (20W) TY CECIL (21W) STY DOT (22W) TS EILIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE (26W) TS IRVING	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS - SHOEMAKE - COLUMBUS - WILLIAMS - WILLIAMS -	76 80 82 84 86 90 92 100 106 108 110
(02W) TS (03W) TY (04W) TD (05W) TY (06W) TY (08W) TY (09W) TS (10W) TY (11W) TY (12W) TY (13W) TS	FABIAN GAY 04 HAL IRMA JEFF KIT LEE MAMIE NELSON ODESSA PAT RUBY	GILFORD GUNZELMAN COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN WILLIAMS SHOEMAKE GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN INDIVIDU	20 22 26 28 34 38 42 46 52 54 58 64 70	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY ERENDA (20W) TY CECIL (21W) STY DOT (22W) TS EILIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE (26W) TS IRVING	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS - SHOEMAKE - COLUMBUS - WILLIAMS -	76 80 82 84 86 90 92 100 106 108 110
(02W) TS (03W) TY (04W) TD (05W) JY (05W) TY (07W) TY (09W) TS (10W) TY (11W) TY (12W) TY (13W) TY (14W) TS	FABIAN GAY 04 HAL IRMA JEFF KIT LIEE MAMIE NELSON ODESSA PAT RUBY	GILFORD GUNZELMAN COLUMBUS COLUMBUS SHOEMAKE WELLS WIMMER GUNZELMAN WILLIAMS SHOEMAKE GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN INDIVIDU	20 22 26 28 34 38 42 46 52 54 58 64 70 1 Ocean Tropical	(15W) TY TESS (16W) TS VAL (17W) TS WINDNA (18W) TY ANDY (19W) TY BERNDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE (26W) TS IRVING PICAL CYCLONES	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS SHOEMAKE - COLUMBUS - WILLIAMS - AUTHOR P	76 80 82 84 86 90 106 108 110 116
(02W) TS (03W) TY (04W) TO (05W) TY (06W) TY (07W) TY (09W) TS (11W) TY (11W) TY (12W) TY (14W) TS	FABIAN GAY 04 HAL IRMA JEFF KIT LEE MAMIE NELSON ODESSA PAT RUBY	GILFORD GUNZELMAN - COLUMBUS SHOEMAKE WELLS GUNZELMAN - WILLIAMS SHOEMAKE WILLIAMS GUNZELMAN GUNZELMAN GUNZELMAN HOEMAKE GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN GUNZELMAN AUTHOR INDIVIDU	20 22 26 28 34 38 42 46 52 54 58 64 70 a Ocean Trop JAL TROPICAL	(15W) TY TESS (16W) TS VAL (17W) TS WINDONA (18W) TY ANDY (19W) TY BRENDA (20W) TY CECIL (21W) STY DOT (22W) TS ELLIS (23W) TY FAYE (24W) TS GORDON (25W) TY HOPE (26W) TS IRVING DICAL CYCLONES TROPICAL CYCLONE	CARPENTER - SHOEMAKE - DYE GATANIS - MCNAMARA - DYE COLUMBUS - WILLIAMS - GATANIS - SHOEMAKE - COLUMBUS - WILLIAMS -	76 80 82 84 86 90 92 100 108 110 116 118

CHAPTER IV	SUMMARY OF SOUTH PACIFIC AND SOUTH INDIAN OCEAN TROPICAL CYCLONES 1. General 138 2. South Pacific and South Indian Ocean Tropical Cyclones -139
CHAPTER V	SUMMARY OF FORECAST VERIFICATION 1. Annual Forecast Verification
CHAPTER VI	APPLIED TROPICAL CYCLONE RESEARCH SUMMARY FROM NAVENVPREDRSCHFAC
ANNEX A	TROPICAL CYCLONE TRACK AND FIX DATA 1. Western North Pacific Data
APPENDICES	I. Definitions
	II. Names of Tropical Cyclones

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CONTRACTIONS

ACCRY	Accuracy	EL	Elongated
ACFT	Aircraft	ELEV	Elevation
ADP	Automated Data Processing	EXP	Exposed
AFGWC	Air Force Global Weather Central	FI	Forecast Intensity (Dvorak)
AIREP	Aircraft Weather Report(s)	FLT	Flight
	(Commercial and Military)	FNOC	Fleet Numerical Oceanography Center
ANT	Antenna	1700	
AOR	Area of Responsibility	FT	Feet
APRNT	Apparent	GMT	Greenwich Mean Time
APT	Automatic Picture Transmission	GOES	Geostationary Operational Environmental Satellite
ARWO	Aircraft Reconnaissance Weather Officer	HATRACK	Hurricane and Typhoon Tracking (Steering) Program
ATT	Attenuated	HGT	Height
AVG	Average	HPAC	Mean of XTRP and CLIM Techniques
AWN	Automated Weather Network		(Half Persistence and Climatology)
BPAC	Blended Persistence and Climatology	HR(s)	Hour(s)
BRG	Bearing	HVY	Heavy
CDO	Central Dense Overcast	ICAO	International Civil Aviation Organization
CI	Cirriform Cloud or Cirrus also Current Intensity (Dvorak)	INIT	Initial
CINCPAC	Commander-in-Chief Pacific AF - Air Force, FLT - Fleet (Navy)	INJAH	North Indian Ocean Component of TYAN
CLD	Cloud	INST	Instruction
CLIM	Climatology	IR	Infrared
CLSD	Closed	KM	Kilometer(s)
СМ	Centimeter	KT	Knot(s)
CNTR	Center	LLCC	Low-Level Circulation Center
CPA	Closest Point to Approach	LVL	Level
csc	Cloud System Center	M	Meter(s)
CYCLOPS	Tropical Cyclone Steering Program	M/S	Meter(s) per Second
	(HATTRACK and MOHATT)	MAX	Maximum
DEG	Degree	MB	Millibar(s)
DIAM	Diameter	MET	Meteorological
DIR	Direction	MIN	Minimum
DMSP	Defense Meterological Satellite Program	ттаном	Modified HATTRACK
DST	Distance	MOVG	Moving

MSLP	Minimum Sea-Level Pressure	STNRY	Stationary	
MSN	Mission	SST	Sea Surface Temperature	
NAV	Navigational	ST	Subtropical	
NEDN	Naval Environmental Data Network	STR	Subtropical Ridge	
NEDS	Naval Environmental Display Station	STY	Super Typhoon	
NEPRF	Naval Environmental Prediction Research Facility	TAPT	Typhoon Acceleration Prediction Technique	
NESDIS	National Environmental Satellite, Data, and Information Service	TC	Tropical Cyclone	
NET	Near Equatorial Trough	TCARC	Tropical Cyclone Aircraft Reconnaissance Coordinator	
NM	Nautical Mile(s)	TCFA	Tropical Cyclone Formation Alert	
N/O	Not Observed	TCM	Tropical Cyclone Model	
NOAA	National Oceanic and Atmospheric Administration	TD	Tropical Depression	
NOCC		OOT	Typhoon Duty Officer	
NOCC NOGAPS	Naval Oceanography Command Center Navy Operational Global Atmospheric	TIROS	Television Infrared Observational Satellite	
NTCM	Prediction System Nested Tropical Cyclone Model	TPAC	Extrapolation and Climatology Blend	
NWOC	Naval Western Oceanography Center	TS	Tropical Storm	
NR	Number	TY	Typhoon	
NRL	Naval Research Laboratory	TYAN	Typhoon Analog Program	
OBS	Observations	TYFN	Western North Pacific Component (Revised) of TYAN	
OTCM	One Way (Interactive) Tropical Cyclone Model	TUTT	Tropical Upper-Tropospheric Trough	
PACOM	Pacific Command	ULAC	Upper-Level Anticyclone	
PCN	Position Code Number	ULCC	Upper-Level Circulation Center	
PSBL	Possible	VEL	Velocity	
PTLY	Partly	VIS	Visual	
QUAD	Quadrant	VMNT	Vector Movement (ddff)	
RADOB	Radar Observations		Western (North) Pacific	
RECON	Reconnaissance	WMO	World Meteorology Organization	
RNG	Range	WND	Wind	
RT	Right	WRNG(s)	Warning(s)	
SAT	Satellite	WRS	Weather Reconnaissance Squadron	
SFC	Surface	XTRP	Extrapolation	
SLP	Sea-Level Pressure	Z	•	
SRP	Selective Reconnaissance Program	ı	Zulu Time (Greenwich Mean Time)	

CHAPTER I - OPERATIONAL PROCEDURES

1. GENERAL

The Joint Typhoon Warning Center (JTWC) provides a variety of routine services to the organizations within its area of responsibility, including:

- a. Significant Tropical Weather Advisories: issued daily, these products describe all tropical disturbances and assess their potential for further development during the advisory period;
- b. Tropical Cyclone Formation Alerts: issued when synoptic, satellite and/or aircraft reconnaissance data indicate development of a significant tropical cyclone in a specified area is likely;
- c. Tropical Cyclone Warnings: issued periodically throughout each day for significant tropical cyclones, giving forecasts of position and intensity of the system; and
- d. Prognostic Reasoning Messages: issued twice daily for tropical storms and typhoons in the western North Pacific; these messages discuss the rationale behind the most recent JTWC warnings.

The recipients of the services of JTWC essentially determine the content of JTWC's products according to their ever changing requirements. Therefore, the spectrum of routine services is subject to change from year to year. Such changes are usually the result of deliberations held at the Annual Tropical Cyclone Conference.

2. DATA SOURCES

a. COMPUTER PRODUCTS:

A standard array of synoptic-scale computer analyses and prognostic charts are available from the Fleet Numerical Oceanography Center (FLENUMOCEANCEN) at Monterey, California. These products are provided to JTWC via the Naval Environmental Data Network (NEDN).

b. CONVENTIONAL DATA:

This data set is comprised of land-based and shipboard surface and upper-air observations taken at, or near, synoptic times, cloud-motion winds derived twice daily from satellite data, and enroute meteorological observations from commercial and military aircraft (AIREPS) within six hours of synoptic times. Conventional data charts are prepared daily at 0000Z and 1200Z using hand- and computer-plotted data for the surface/gradient and 200mb (upper-tropospheric) levels. In addition to these analyses, charts at the 850, 700, and 500 mb levels are computer-plotted from rawinsonde/pibal observations at the 12-hour synoptic times.

c. AIRCRAFT RECONNAISSANCE:

Aircraft weather reconnaissance data are invaluable for locating the position of the center of developing systems and essential for the accurate determination of:

- maximum surface and flight level wind
- minimum sea-level pressure
- horizontal surface and flight level wind dis-

tribution

- eye/center temperature and dewpoint

In addition, wind and pressure-height data at the 500 and/or 400 mb levels, provided by the aircraft while enroute to, or from fix missions, or during dedicated synoptic-scale flights, provide a valuable supplement to the all too sparse data fields of JTWC's area of responsibility. A more detailed discussion of aircraft weather recommaissance is presented in Chapter II.

d. SATELLITE RECONNAISSANCE:

Meteorological satellite data obtained from the Defense Meteorological Satellite Program (DMSP) and National Oceanic and Atmospheric Administration (NOAA) spacecraft played a major role in the early detection and tracking of tropical cyclones in 1985. A discussion of the role of these programs is presented in Chapter II.

e. RADAR RECONNAISSANCE:

During 1985, as in previous years, land based radar coverage was utilized extensively when available. Once a tropical cyclone moved within the range of land based radar sites, their reports were essential for determination of small scale movement. Use of radar reports during 1985 is discussed in Chapter II.

3. COMMUNICATIONS

- a. JTWC currently has access to three primary communications circuits.
- (1) The Automated Digital Network (AUTODIN) is used for dissemination of warnings, alerts and other related bulletins to Department of Defense installations. These messages are relayed for further transmission over U.S. Navy Fleet Broadcasts, and U.S. Coast Guard CW (continuous wave Morse Code) and voice broadcasts. Inbound message traffic for JTWC is received via AUTODIN addressed to NAVOCEANCOMCEN GQ, JTWC GQ, or DET 1 1WW NIMITZ HILL GQ.
- (2) The Air Force Automated Weather Network (AWN) provides weather data to JTWC through a dedicated circuit from the Automated Digital Weather Switch (ADWS) at Hickam AFB, Hawaii. The ADWS selects and routes the large volume meteorological reports necessary to satisfy JTWC requirements for the right data at the right time. Weather bulletins prepared by JTWC are inserted into the AWN circuit via the Naval Environmental Display Station (NEDS) through the Nimitz Hill Naval Telecommunications Center (NTCC) of the Naval Communications Area Master Station Western Pacific.
- (3) The Naval Environmental Data Network (NEDN) is the communications link with the computers at FLENUMOCEANCEN. JTWC is able to receive environmental data from FLENUMOCEANCEN and provide data directly to the computers to execute numerical techniques.
- b. NEDS is the backbone of the JTWC communications system. It is the terminal that provides a direct interface with the NEDN and AWN circuits, and is capable of preparing messages for indirect AUTODIN transmission.

4. ANALYSES

A composite surface/gradient level (3000 ft (915 m)) manual analysis of the JTWC area of responsibility is accomplished on the 0000Z and 1200Z conventional data. Analysis of the wind field using streamlines is stressed for tropical and subtropical regions. Analysis of the pressure field outside the tropics is accomplished routinely by the Naval Oceanography Command Center (NOCC) Operations watch team and is used by JTWC in conjunction with their analysis of the tropical wind fields.

A composite upper-tropospheric manual streamline analysis is accomplished daily utilizing rawinsonde data from 300 mb through 100 mb, winds obtained from satellite-derived cloud motion analysis, and AIREPS (taken plus or minus six hours of chart valid time) at or above 29,000 feet (8,839m). Wind and height data are used to generate a representative analysis of tropical cyclone outflow patterns, mid-latitude steering currents, and features that may influence tropical cyclone intensity. All charts are hand-plotted in the tropics to provide all available data as soon as possible to the TDO. These charts are augmented by computer-plotted charts for the final analysis.

Computer-plotted charts for the 850, 700, and 500 mb levels are available for streamline and/or height-change analysis from the 00002 and 12002 data base. Additional sectional charts at intermediate symptic times and auxilary charts such as station-time plot diagrams and pressure-change charts are also analyzed during periods of significant tropical cyclone activity.

5. FORECAST AIDS

The following objective techniques were employed in tropical cyclone forecasting during 1985 (a description of these techniques is presented in Chapter V):

a. MOVEMENT

- (1) 12-HOUR EXTRAPOLATION
- (2) CLIMATOLOGY
- (3) TPAC (Extrapolation and Climatology Blend)
- (4) TYAN78 (Analog)
- (5) COSMOS (Model Output Statistics)
- (6) OTCM (Dynamic Model)
- (7) NTCM (Nested Grid Dynamic Model)
- (8) TAPT (Empirical)

b. INTENSITY

- (1) THETA E (Empirical)
- (2) DVORAK (Empirical)

- (3) CLIMATOLOGY
- (4) WIND RADIUS (Analytical)

6. FORECAST PROCEDURES

a. INITIAL POSITIONING

The warning position is the best estimate of the center of the surface circulation at synoptic time. It is estimated from an analysis of all fix information received up to one and one-half hours after synoptic time. This analysis is based on a semi-objective weighting of fix information based on the historical accuracy of the fix platform and the meteorology features used for the fix. The interpolated warning position reduces the weighting of any single fix and results in a more consistent movement and a warning position that is more representative of the larger-scale circulation. If the fix data are not available due to reconnaissance platform malfunction or communication problems, synoptic data or extra-polation from previous fixes are used.

b. TRACK FORECASTING

A preliminary forecast track is developed based on an evaluation of the rationale behind the previous warning and the guidance given by the most recent set of objective techniques and numerical prognoses. This preliminary track is then subjectively modified based on the following considerations:

- (1) The prospects for recurvature or erratic movement are evaluated. This evaluation is based primarily on the present and forecast positions and amplitudes of the middle-tropospheric, mid-latitude troughs and ridges as depicted on the latest upperair analysis and numerical forecasts.
- (2) Determination of the best steering level is partly influenced by the maturity and vertical extent of the tropical cyclone. For mature tropical cyclones located south of the subtropical ridge, forecast changes in speed of movement are closely correlated with anticipated changes in the intensity or relative position of the ridge. When steering currents are relatively weak, the tendency for tropical cyclones to move northward due to internal forces is an important consideration.
- (3) Over the 12- to 72-hour (12- to 48-hour in the Southern Hemisphere) forecast period, speed of movement during the early forecast period is usually biased towards persistence, while the subsequent forecast periods are biased towards objective techniques. When a tropical cyclone moves poleward, and toward the mid-latitude steering currents, speed of movement becomes increasingly more biased toward a selective group of objective techniques capable of estimating significant increases in speed of movement.
- (4) The proximity of the tropical cyclone to other tropical cyclones is closely evaluated to determine if there is a possibility of interaction.
 - A final check is made against climatology to

determine whether the forecast track is reasonable. If the forecast deviates greatly from one of the climatological tracks, the forecast rationale may be reappraised.

c. INTENSITY FORECASTING

For this parameter, heavy reliance is placed on intensity trends from aircraft reconnaissance reports, wind and pressure data from ships and land stations in the vicinity of the tropical cyclone. the Dvorak satellite empirical model and climatology. An evaluation of the entire synoptic situation is made, including the location of major troughs and ridges, the position and intensity of any nearby tropical upper-tropospheric troughs (TUTTs), the vertical and horizontal extent of the tropical cyclone's circulation and the extent of the associated upper-level outflow pattern. An essential element affecting each intensity forecast is the accompanying forecast track and the environmental influences along that track, such as terrain, vertical wind shear, and the existence of an extratropical environment.

Once the forecast intensities have been derived, the horizontal distribution of surface winds (winds greater than 30-, 50-, and 100-knots) is determined. The most recent wind radii and associated asymmetrics are deduced from all available surface wind observations and reconnaissance aircraft reports. Based on the current surface wind distribution, preliminary estimates of future wind radii are provided by an empirically derived objective technique. These estimates may be subjectively modified based upon the anticipated interaction of the tropical cyclone's circulation with forecast locations of large-scale wind regimes and significant land masses. Other factors including the tropical cyclone's speed of movement and possible extratropical transition are also considered.

7. WARNINGS

Tropical cyclone warnings are issued when a closed circulation is evident and maximum sustained winds are forecast to increase to 34 knots (18 meters per second) within 48 hours, or if the tropical cyclone is in such a position that life or property may be endangered within 72 hours. Warnings may also be issued in other situations if it is determined that there is a need to alert military or civil interests to conditions which may become hazardous in short period of time.

Each tropical cyclone warning is numbered sequentially and includes the following information: the position of the surface center; estimate of the position accuracy and the supporting reconnaissance (fix) platforms; the direction and speed of movement during the past six hours (past 12 hours in the southern hemsiphere); and the intensity and radial extent of surface winds over 30-, 50-, and 100-knots, when applicable. At forecast intervals of 12-, 24-, 48-, and 72-hours (12-, 24-, and 48-hours in the southern hemisphere), information on the tropical cyclone's anticipated position, intensity and wind radii are also provided. Vectors indicating the mean direction and mean speed between forecast positions were also included in all warnings.

Warnings in the western North Pacific and North Indian Oceans are issued every six hours valid at standard times; 0000Z, 0600Z, 1200Z and 1800Z (every twelve hours; 0000Z, 1200Z or 0600Z, 1800Z in the Southern Hemisphere). All warnings are released to the communications network no earlier than synoptic time and no later than synoptic time plus two and

one-half hours so that recipients will have a reasonable expectation of having all warnings "in hand" by synoptic time plus three hours (0300Z, 0900Z, 1500Z and 2100Z).

Warning forecast positions are later verified against the corresponding "best track" positions (obtained during detailed post-storm analysis to determine the actual path and intensity of the cyclone). A summary of the verification results for 1985 is present in Chapter V.

8. PROGNOSTIC REASONING MESSAGES

For tropical storms and typhoons in the western North Pacific Ocean, prognostic reasoning messages are transmitted following the 0000Z and 1200Z warnings, or whenever the forecast reasoning is no longer valid. This plain language message is intended to provide meteorologists with the reasoning behind the latest forecast.

In addition to this message, prognostic reasoning information applicable to all customers is provided in the remarks section of warnings when significant forecast changes are made or when deemed appropriate by the TDO.

9. TROPICAL CYCLONE FORMATION ALERT

Tropical Cyclone Formation Alerts (TCFAs) are issued whenever interpretation of satellite imagery and other meteorological data indicates that the formation of a significant tropical cyclone is likely. These formation alerts will specify a valid period not to exceed twenty-four hours and must either be cancelled, reissued, or superseded by a tropical cyclone warning prior to the expiration of the valid time.

10. SIGNIFICANT TROPICAL WEATHER ADVISORY

This product contains a general, non-technical description of all tropical disturbances in the JTWC area of responsibility (AOR) and an assessment of their potential for further (tropical cyclone) In addition, all tropical cyclones in development. warning status are briefly discussed. This message is issued once daily at 0600Z and is valid for a 24-hour period. (As of 1 August 1985 this single message was divided into two separate messages to better handle the meteorological watch of the AOR. The AOR east of 100 degrees East longitude is covered by message at 0600Z daily and the AOR west of 100 degrees East longitude at 1800Z daily. Both remain valid for a twenty-four hour period.) It is reissued whenever the situation warrants. For each suspect area, the words "poor", "fair", and "good" are used to describe the potential for further development. "Poor" is used to describe a tropical disturbance that is not expected to require a TCFA during the advisory period; "fair" is used to describe a tropical disturbance that is currently not covered by a TCFA, but for which it is likely that a TCFA will be issued during the advisory period; and "good" is used when the tropical disturbance is covered by a TCFA.

CHAPTER II - RECONNAISSANCE AND FIXES

1. GENERAL

The Joint Typhoon Warning Center depends on reconnaissance to provide necessary, accurate, and timely meteorological information in support of each warning. JTWC relies primarily on three reconnaissance platforms: aircraft, satellite, and radar. In data rich areas synoptic data are also used to supplement the above. Optimum utilization of all available reconnaissance resources is obtained through the Selective Reconnaissance Program (SRP); various factors are considered in selecting a specific reconnaissance platform including capabilities and limitations, and the tropical cyclone's threat to life and property both afloat and ashore. A summary of reconnaissance fixes received during 1985 is included in Section 6 of this chapter.

2. RECONNAISSANCE AVAILABILITY

a. Aircraft

Aircraft weather reconnaissance for the JTWC is performed by the 54th Weather Reconnaissance Squadron (54th WRS) located at Andersen Air Force Base, Guam. The 54th WRS is presently equipped with six WC-130 aircraft and, from July through October, is normally augmented by two additional aircraft from the 53rd WRS, Keesler Air Force Base, Mississippi, bringing the total number of available aircraft to eight. The JTWC reconnaissance requirements are provided daily to the Tropical Cyclone Aircraft Reconnaissance Coordinator (TCARC), who marries the tasking from the JTWC with the available airframes from the 54th WRS.

As in previous years, aircraft reconnaissance provides direct measurements of standard pressure-level height, temperature, flight-level winds, sealevel pressure, estimated surface winds (when observable), and numerous additional parameters. The meteorological data are gathered by the Aerial Reconnaissance Weather Officer (ARWO) and dropsonde operators of Detachment 3, 1st Weather Wing who fly with the 54th WRS. These data provide the Typhoon Duty Officer (TDO) with indications of tropical cyclone position and intensity. Another important aspect is the availability of the data for technique development and tropical cyclone research.

b. Satellite

Satellite fixes from USAF/USN ground sites and USN ships provide day and night coverage in the JTWC area of responsibility. Interpretation of this satellite imagery provides tropical cyclone positions and estimates of current and forecast intensities through the Dvorak technique.

c. Radar

Land radar provides positioning data on well developed tropical cyclones when in the proximity (usually within 175 nm (324 km)) of the radar sites in the Philippines, Taiwan, Hong Kong, Japan, South Korea, Kwajalein, and Guam.

d. Synoptic

JTWC also determined tropical cyclone positions based on the analysis of the surface/ gradient level synoptic data. These positions were helpful in sit-

uations where the vertical structure of the tropical cyclone was weak or accurate surface positions from aircraft of satellite were not available.

3. AIRCRAFT RECONNAISSANCE SUMMARY

During 1985, JTWC levied requirements for 192 vortex fixes and 59 investigative missions of which 12 were flown into disturbances that did not develop. In addition to the levied fixes, 167 intermediate fixes were also obtained. Eighteen synoptic missions were requested and flown to provide mid-level steering information. The average vector error for all aircraft fixes received at the JTWC during 1985 was 11 nm (20 km).

Aircraft reconnaissance effectiveness is summarized in Table 2-1 using the criteria set forth in CINCPACINST 3140.1 (series).

4. SATELLITE RECONNAISSANCE SUMMARY

The Air Force provides satellite reconnaissance support to JTWC using imagery from a variety of spacecraft. The tropical cyclone satellite surveillance network consists of both tactical and centralized facilities. Tactical DMSP sites are located at Nimitz Hill, Guam; Clark AB, Republic of the Philippines; Kadena AB, Japan; Osan AB, Korea; and Hickam AFB, Hawaii. These sites provide a combined coverage that includes most of the JTWC area of responsibility in the western North Pacific from near

TABLE 2-1. AIRCRAI	T RECONNAISSANCE	EFFECTIVENESS
EFFECTIVENESS	NUMBER OF LEVIED FIXE	S PERCENT
COMPLETED ON TIME	174	90.6
EARLY	4	2.1
LATE	4	2.1
MISSED	10	5.2
TOTAL	192	100.0
LEVIED	VS. MISSED FIXES	
AVERAGE 1965-1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985	LEVIED MISSE 507 10 802 61 624 126 227 13 358 30 217 7 317 11 203 3 290 2 289 14 213 4 201 3 276 17 157 3 210 2 192 10	D PERCENT 2.0 2.0 20.2 5.7 8.4 3.2 3.5 1.5 0.7 4.8 1.9 1.5 6.2 1.9 1.0 5.2

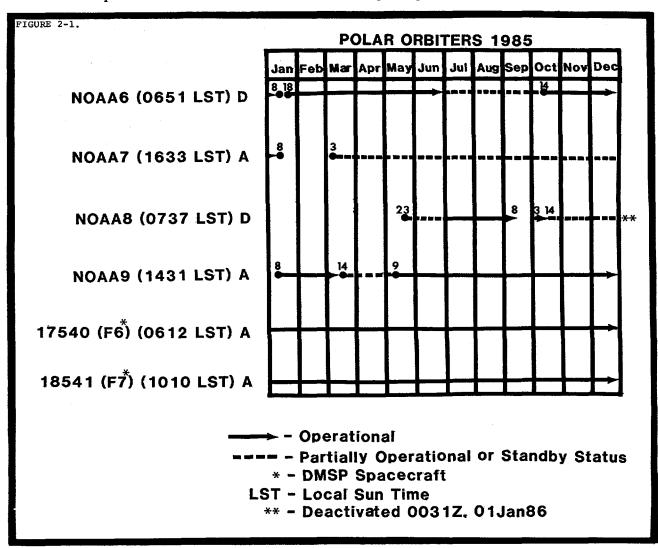
the dateline westward to the Malay Peninsula. JTWC relies on the Air Force Global Weather Central (AFGWC) to provide coverage over the remainder of its area of responsibility using stored satellite data. The Naval Oceanography Command Detachment, Diego Garcia, provides NOAA polar-orbiting coverage in the central Indian Ocean as a supplement to this support. U.S. Navy ships equipped for direct readout also provide supplementary support.

AFGWC, located at Offutt AFB, Nebraska, is the centralized member of the tropical cyclone satellite surveillance network. In support of JTWC, AFGWC processes stored imagery from DMSP and NOAA spacecraft. Imagery processed at AFGWC is recorded onboard the spacecraft as it passes over the earth. Later, these data are downlinked to AFGWC via a network of command readout sites and communication satellites. This enables AFGWC to obtain the coverage necessary to fix all tropical systems of interest to JTWC. AFGWC has the primary responsibility to provide tropical cyclone surveillance over the entire Indian Ocean, southwest Pacific, and the area near the dateline. Additionally, AFGWC can be tasked to provide tropical cyclone positions in the entire western North Pacific as backup to coverage routinely available in that region.

The hub of the network is Det 1, 1WW, collocated with JTWC on Nimitz Hill, Guam. Based on available satellite coverage, Det 1 coordinates satellite reconnaissance requirements with JTWC and tasks the

individual network sites for the necessary tropical cyclone fixes. When a position from a polar-orbiting satellite is required as the basis for a warning, it is called a "levied fix". To satisfy the "levied fix", two sites are tasked to fix the tropical cyclone from the same satellite pass. This provides the necessary redundancy to virtually guarantee JTWC a successful satellite fix on the tropical cyclone. Using this "dual-site" concept, the satellite reconnaissance network is capable of meeting all of JTWC's levied satellite fix requirements.

The network provides JTWC with several products and services. The main service is one of surveillance. Each site reviews its daily satellite coverage for indications of tropical cyclone development. If an area exhibits the potential for development, JTWC is notified. Once JTWC issues either a formation alert or warning, the network is tasked to provide three products: tropical cyclone positions, intensity estimates, and 24-hour intensity forecasts. Satellite tropical cyclone positions are assigned Position Code Numbers (PCN) to indicate the accuracy of the fix position. This is dependent upon the availability of visible landmarks in the image for precise gridding, and the degree of organization of the tropical cyclone's cloud system (Table 2-2). During 1985, the network provided JTWC with a total of 2505 satellite fixes on tropical systems in the western North Pacific. This is a record number of fixes for the year. Another 195 fixes were made for tropical systems in the North Indian Ocean. A



comparison of those fixes of numbered tropical cyclones in the western North Pacific with their corresponding JTWC best track positions is shown in Table 2-3a (Comparison of fixes with the corresponding best track for the South Pacific and Indian Oceans is presented in Table 2-3b). Estimates of the tropical cyclone's current intensity and 24-hour intensity forecast are made every 12 hours by applying the Dvorak technique (NOAA Technical Report NESDIS 11) to visual and enhanced infrared imagery.

Figure 2-1 shows the status of operational polar orbiting spacecraft. Six were available at various times in 1985. NOAA 6 suffered low power problems from the 8th of January to the 18th. It continued to operate with degraded imagery until July, when it was placed on standby and replaced by the repaired NOAA 8. NOAA 8 suffered from continuing oscillator problems until finally deactivated on 1 January 1986,

TABL	E 2-2. POSITION CODE NUMBERS
PCN	METHOD OF CENTER DETERMINATION/GRIDDING
1 2	EYE/GEOGRAPHY EYE/EPHEMERIS
3	WELL DEFINED CC/GEOGRAPHY WELL DEFINED CC/EPHEMERIS
5 6	POORLY DEFINED CC/GEOGRAPHY POORLY DEFINED CC/EPHEMERIS

leaving NOAA 6, once again, as the primary morning spacecraft. NOAA 7 was placed on standby March 3rd after operating with impaired high resolution picture transmissions (HRPT) since 8 January. It was replaced by NOAA 9, (launched 12 December 1984) which became fully operational 9 May. At the end of the year, NOAA 9 was the only fully operational NOAA satellite.

5. RADAR RECONNAISSANCE SUMMARY

Seventeen of the 27 significant tropical cyclones in the western North Pacific during 1985

passed within range of land-based radar with sufficient cloud pattern organization to be fixed. The land radar fixes that were obtained and transmitted to JTWC totaled 1360. Three radar fixes were obtained by reconnaissance aircraft.

The WMO radar code defines three categories of accuracy: good (within 10 km (5mm)), fair (within 10-30 km (5-16 mm)), and poor (within 30-50 km (16-27nm)). Of the 1091 radar fixes coded in this manner; 299 were good, 413 were fair, and 379 were poor. Compared to the JTWC best track, the mean vector deviation for land radar sites was 13 nm (24 km). Excellent support through timely and accurate radar fix positioning allowed JTWC to track and forecast tropical cyclone movement through even the most difficult erratic tracks.

As in previous years, no radar reports were received on North Indian Ocean tropical cyclones.

TABLE 2-3b.	MEAN DEVIATION (NM) OF ALL SATELLITE DERIVED TROPICAL CYCLONE POSITIONS IN THE SOUTH PACIFIC ANC SOUTH INDIAN OCEANS. NUMBER OF CASES IN (PARENTHESES).
	1985
PCN	(ALL SITES)
1 2 3 4 5	15.8 (20) 15.5 (168) 26.1 (42) 29.2 (190) 46.9 (241) 39.8 (1140)
162	1 5.5 (188)
344	28.7 (232)
546	41.1 (1381)
TOTAL NUMBER OF CASES	(1801)

6. TROPICAL CYCLONE FIX DATA

A total of 4268 fixes on 27 western North Pacific tropical cyclones and 195 fixes on 6 North Indian Ocean tropical cyclones were received at JTWC. Table 2-4a, Fix Platform Summary, delineates the number of fixes per platform for each individual tropical cyclone. Season totals and percentages are

TABLE 2-3a.	CYCLONE POSITIONS FROM THE JTWC BEST TRACK POSITIONS IN THE WESTERN NORTH PACIFIC AND NORTH INDIAN OCEANS. NUMBER OF CASES (IN PARENTHESES).								
	WESTERN NO	RTH PACIFIC OCEAN	NORTH INDI	AN OCEAN					
	1975-1984 AVERA	GE 1985	1980-1984 AVERAGE	1985					
PCN	(ALL SITES)	(ALL SITES)	(ALL SITES)	(ALL SITES)					
1 2 3 4 5	13.3 (1505)	17.7 (127)	16.7 (40)	(0)					
3	17.0 (1617) 20.6 (2176)	13.2 (175) 24.8 (191)	18.9 (7) 21.4 (13)	(0) 11.5 (8)					
4	23.9 (1000)	19.5 (300)	64.6 (8)	33.1 (2)					
5	37.4 (4070)	37.0 (311)	34.8 (171)	28.9 (49)					
6	42.4 (2278)	32.8 (972)	41.1 (106)	33.6 (97)					
1&2	15.2 (3122)	15.1 (302)	17.2 (47)	(0)					
3&4	21.6 (3176)	21.6 (491)	41.3 (21)	15.8 (10)					
5&6	39.2 (6348)	33.8 (1283)	36.1 (277)	32.1 (146)					
TOTAL NUMBER OF CASES	(12646)	(2076)	(345)	(156)					

TABLE 2-4a. FIX PLATFORM SUMMARY FOR 1985.						
				-		
		PIX PLAT	TTORM SUMMA	RY		
WESTERN NORTH PACIFIC	AIRCRAFT	SATELLITE	RADAR	SYNOPTIC	TOTAL	
TS ELSIE (01W)	3	23	_	1	27	
TS FABIAN (02W)	7	82 127		8	97 137	
TY GAY (03W)	18	40	_	4	44	
TY HAL (05W)	12	119	79	4	214	
TY IRMA (06W) TY JEFF (07W)	22 23	110 180	83 99	12	215 314	
TY JEFF (07W) TY KIT (08W)	29	165	289	4	487	
TS LEE (09W)	10	61	28	=	99	
TY MAMIE (10W) TY NELSON (11W)	2 20	70 113	9 141	. 7 1	88 275	
TY ODESSA (12W)	31	135	144	-	310	
TY PAT (13W)	16	101	88	1	206	
TS PURY (14W) TY SKIP (02C)	8 20	52 118	52	-	112 138	
TY TESS (15W)	12	86	54	-	152	
TS VAL (16W)	. 3	64 47	19	3	67 69	
TS WINONA (17W) TY ANDY (18W)	-	60	14	2	76	
TY BRENDA (19W)	21	95	57	4	177	
TY CECIL (20W) STY DOT (21W)	B 2€	70 144	8 57	= -	86 225	
TS ELLIS (22W)	14	64		3	81	
TY PAY (23W)	31	144	139	-	31.4	
TS GORDON (24W) TY HOPE (25W)	3 17	86 90	-		89 107	
TS IRVING (26W)	Ĩá	59	-	_	62	
	<u> </u>					
					4268	
TOTAL	349	2505	1360	54	4268	
% OF TOTAL				1.2	300.0	
NR OF PIXES	8.2	58.7	31.9	1.2	100.0	
		PAMPI I TMP			TOTAL	
NORTH INDIAN OCEAN		SATELLITE				
TC 01B	:	36			36 25	
TC 02A TC 03B		25 26			25 26	
TC 04B		20			20	
TC 05B		30 58			30 58	
TC 06B		30			"	
		• • • • • • • • • • • • • • • • • • • •			195	
TOTAL	94	195			133	
1 OF TOTAL	11	200.0		100	200.0	
NR OF FIXES		100.0	+	11	100,0	

SUMMARY		
SUMMARY		
RADAR	SYNOPTIC	TOTAL
s E s	- · · · · <u>- ·</u>	41 63
· I ·	ī	49
-	-	51
8	1	73
-	.2	27
-		43
-	-	47
	=	20
-	1	57
-	-	61 29
	=	75
	-	65
_	_	36
_	-	26
-		17
-	-	66
-	3	39
-	.	87
-	1	33 92
_		86
-	_	21
_	_	121
_	_	46
-	-	58
-	-	98
-	-	30
-	-	90
-	:	116
-	1	87
8	1	51 62
-	-	87
16	11	2050
		100.0
	16	

also indicated. (Table 2-4b provides the same information for the South Pacific and South Indian Oceans.)

Annex A includes individual fix data for each tropical cyclone in the western North Pacific and North Indian Oceans. (Additionally, it includes individual fix data for each tropical cyclone in the South Pacific and South Indian Oceans.) Fix data are divided into four categories: satellite, aircraft, radar, and synoptic. Those fixes labeled with an asterisk (*) were determined to be unrepresentative of the surface center and were not used in determining the best tracks. Within each category, the first three columns are as follows:

FIX NO. - Sequential fix number

TIME (Z) - GMT time in day, hours, and minutes

FIX POSITION - Latitude and longitude to the nearest tenth of a degree

Depending on the category, the remainder of the format varies as follows:

a. Satellite

- (1) ACCRY Position Code Number is used to indicate the accuracy of the fix position. A "1" or "2" indicates relatively high accuracy and a "5" or "6" relatively low accuracy (reference Table 2-2, Postion Code Numbers).
- (2) DVORAK CODE Intensity evaluation and trend (Figure 2-2, Table 2-5). (For specifics, refer to NOAA Technical Report NESDIS 11.)
- (3) COMMENTS For an explanation of the contractions, see pages vi and vii.
- $\mbox{(4)}$ SITE ICAO call sign of the specific satellite tracking station.

b. Aircraft

- (1) FLT LVL The constant pressure surface level, in millibars, or altitude, in feet, maintained during the penetration. The usual flight level flown in developing tropical cyclones is 700 mb, due to turbulence considerations. Low-level missions are normally flown at 1500 ft (457 m).
- (2) 700 MB HGT Minimum height of the 700 mb pressure surface within the vortex recorded in meters.
- (3) OBS MSLP If the surface center can be visually detected (e.g., in the eye), the minimum sea-level pressure is obtained by a dropsonde release above the surface vortex center. If the fix is made at the 1500-foot level, the sea-level pressure is extrapolated from that level.
- (4) MAX-SFC-WND The maximum surface wind (knots) is an estimate made by the ARWO based on sea state. This observation is limited to the region of the flight path and may not be representative of the entire tropical cyclone. Availability of data is also dependent upon the absence of undercast conditions and the presence of adequate illumination. The positions of the maximum flight level wind and the maximum observed surface wind do not necessarily coincide.
- (5) MAX-FIT-LVL-WND Wind speed (knots) at fight level is measured by the ANVAPN 147 doppler radar system aboard the WC-130 aircraft. This measurement may not represent the maximum flight level wind associated with the tropical cyclone

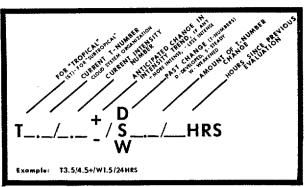


Figure 2-2. Dvorak code for communicating estimates of current and forecast intensity derived from satellite data. In the example the current T-number is 3.5 but the current intensity estimate is 4.5 (equivalent to 17 kt). The cloud system has weakened by 1.5 T-numbers since the previous evaluation conducted 24 hours earlier. The plus (+) symbol indicates an expected reversal of the weakening trend or very little further weakening of the tropical cyclone during the next 24-hour period.

AS A (CURR NUMBE	FUNCTION OF	WIND SPEED (KT) DVORAK CI & FI ST INTENSITY) M SEA-LEVEL
TROPICAL CYCLONE	WIND	MSLP
INTENSITY NUMBER	SPEED	(NW PACIFIC)
		<u> </u>
0.0	<25	
0.5	25	
1.0	25	
1.5	25	
2.0	30	1000
2.5	35	997
3.0	45	991
3.5	55	984
4.0	65	976
4.5	77	966
5.0	90	953
5.5	102	941
6.0	115	927
6.5	127	914
7.0	140	898
7.5	155	879
8.0	170	858

because the aircraft only samples those portions of the tropical cyclone along the flight path. In many instances, the flight path is through the weakest sector of the tropical cyclone. In areas of heavy rainfall, the doppler radar may track energy reflected from precipitation rather than from the sea surface, thus, preventing accurate wind speed measurement. In obvious cases, such erroneous wind data will not be reported. In addition, the doppler radar system on the WC-130 restricts wind measurements to drift angles less than or equal to 27 degrees if the wind is normal (perpendicular) to the aircraft heading.

- (6) ACCY Fix position accuracy. Both navigational (OMEGA and LORAN) and meteorological (by the ARWO) estimates are given in nautical miles.
- (7) EYE SHAPE Geometrical representation of the eye based on the aircraft radar presentation. The eye shape is reported only if the center is 50 percent or more surrounded by wall cloud.
- (8) EYE DIA/ORIENTATION Diameter of the eye in nautical miles. When an elliptical eye is present, the lengths of the major and minor axes and the orientation of the major axis are respectively listed. When concentric eye walls are present, each diameter is listed.

c. Radar

- (1) RADAR Specific type of platform (land, aircraft, or ship) utilized for fix.
- (2) ACCY Accuracy of fix position (good, fair, or poor) as given in the WMO ground radar weather observation code (FM20-V).
- (3) EYE SHAPE Geometrical representation of the eye given in plain language (circular, elliptical, etc.).
- (4) EYE DIA Diameter of eye given in kilometers.
- (5) RADOB CODE Taken directly from WMO ground weather radar observation code FM20-V. The first group specifies the vortex parameters, while the second group describes the movement of the vortex center.

- (6) RADAR POSITION Latitude and longitude of tracking station given in tenths of a degree.
- $\ensuremath{\text{(7)}}$ SITE WMO station number of the specific tracking station.

d. Synoptic

- (1) INTENSITY ESTIMATE An estimate of the tropical cyclone's maximum sustained surface wind in knots is based on the tropical cyclone forecaster's analysis of low-level synoptic data.
- (2) NEAREST DATA The accuracy of a synoptic fix is based on the distance in nautical miles from the estimated fix position to the nearest synoptic report or to the average distance of reports in data sparse areas.
- (3) COMMENTS For an explanation of the contractions see pages vi and vii.

CHAPTER III - SUMMARY OF WESTERN NORTH PACIFIC AND NORTH INDIAN OCEAN TROPICAL CYCLONES

1. GENERAL

During 1985, JTWC issued warnings on 27 western North Pacific tropical cyclones (1 tropical depression, 9 tropical storms, 16 typhoons and one supertyphoon). This was almost an average year when compared to the climatological mean of 27 for the frequency of tropical storms and typhoons. Six north Indian Ocean tropical cyclones, all of tropical storm intensity, developed as compared to the climatological average of four. In summary, JTWC issued warnings on 33 northern hemisphere tropical cyclones.

In 1985 for the western North Pacific there were 127 warning days - a warning day is defined as a day during which JTWC issues warnings on at least one tropical cyclone. For 38 of these 127 days, warnings were being issued on two tropical cyclones. There were also 2 three-cyclone days, 2 four-cyclone days, and one day in which JTWC issued warnings on five different WESTPAC tropical cyclones at the same time. When the north Indian Ocean tropical cyclones are included, there were 141 warning days, 41 two-cyclone days, 3 three-cyclone days, 3 four-cyclone days and 1 five-cyclone day.

Six hundred and fifteen warnings were issued on the 27 western North Pacific tropical cyclones and 54 were issued on the six north Indian Ocean tropical cyclones. There were 39 initial Tropical Cyclone Formation Alerts (TCFA) for WESTPAC and 8 for the north Indian Ocean. In WESTPAC, TCFAs were issued for all except one of the significant tropical cyclones that developed during 1985. The false alarm rate of 33% for WESTPAC seems fairly high, however, it did enable JTWC to provide the customer with an mean lead time of 27.5 hours on significant tropical cyclone development. For the North Indian Ocean TCFAs were issued for all but one of the significant tropical cyclones. The false alarm rate for TCFAs was 38% with a mean lead time of 20.2 hours.

2. WESTERN NORTH PACIFIC TROPICAL CYCLONES

There are several interesting aspects of the 1985 tropical cyclone activity. In general, it can be neatly divided into two periods: the early part, January to August and the late, September to December (see composite tropical cyclone best tracks on pages 15 and 16). The early 1985 composite best tracks show that the overwhelming majority of the tropical

cyclones during that period recurved, that is: 11 recurvers versus 3 west-northwest straight runners and one low-latitude tropical storm (Fabian) which behaved erratically. This is somewhat atypical since, normally, the majority of the recurvers occur during the later part of the year when breaks in the subtropical high pressure ridge develop as the influence of the mid-latitude troughs extends further south with the approach of fall. The Philippine Islands were spared during the first part of the year, except for a glancing blow from Typhoon Hal in June. However, during that period, no less than 8 tropical cyclones affected, or posed a direct threat to, Okinawa, Korea and Japan. In some cases the same tropical cyclone affected all three. Notice the point 200 nm (370km) south-southeast of Okinawa four, and nearly five, different tropical cyclone tracks intersected at that location. The major generation areas during the first part of the year were: a two-to-three degree swath centered on six degrees north latitude, from the southeastern coast of the Philippine Islands to near Ponape; another area north of Guam; and a third area south of

A major shift in tropical cyclone activity occurred during the second part of the year (see composite best tracks on page 16). Notice that only 2 tropical cyclones recurved. Whereas, Japan and Korea received the brunt of the tropical cyclone activity the first half of the year, it was the Philippines and Vietnam which suffered most during the second. Three typhoons and one supertyphoon transited Luzon. In addition, one typhoon crossed the southern Philippine Islands. Three typhoons affected northern Vietnam and a total of 4 typhoons and 4 tropical storms struck the Asian mainland from southern Vietnam to the vicinity of Hong Kong. The major generation areas were: one west of Palawan Island in the South China Sea, and the other south and southeast of Guam. This contrasts with the first part of the year, when generation locations were more evenly distributed over WESTPAC.

In the western North Pacific, tropical cyclones reaching tropical storm intensity, or greater, are assigned names in alphabetical order from a list of alternating male/female names (refer to Appendix II). Table 3-1 provides a summary of key statistics for all western North Pacific tropical cyclones. Each tropical cyclone's maximum surface wind and minimum sea-level pressure (in millibars) were obtained from best estimates based on all available data. The distance traveled was calculated from the JTWC official best tracks (see Annex A).

TABLE 3-1.

WESTERN NORTH PACIFIC

1985 SIGNIFICANT TROPICAL CYCLONES

TROPICAL	CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	NUMBER OF WARNINGS ISSUED	MAXIMUM SURFACE WINDS-KT (M/S)	ESTIMATED MSLP- MB	BEST DIST TRAVELE	
01W TS E	ELSIE	07 JAN - 09 JAN	3	9	40 (21)	995	976	(1808)
	ABIAN	09 JAN - 13 JAN	5	16	55 (28)	989	507	(939)
03W TY G	SAY	21 MAY - 26 MAY	6	22	100 (51)	951		(2711)
04W TD 0)4W	18 JUN - 20 JUN	3	10	30 (15)	992	441	(817)
05W TY H	IAL	19 JUN - 25 JUN	6	22	100 (51)	942		(2417)
06W TY I	I RMA	25 JUN - 01 JUL	7	27	90 (46)	957		(4469)
07W TY J	JEFF	22 JUL - 02 AUG	12	43	75 (39)	967		(4941)
08W TY K	CIT	03 AUG - 11 AUG	9	33	85 (44)	959		(3617)
09W TS L	EE	11 AUG - 14 AUG	4	15	60 (31)	985		(2456)
10W TY M	MAMIE	16 AUG - 20 AUG	5	17	70 (36)	975		(2472)
11W TY N	NELSON	17 AUG - 24 AUG	. 8	27	95 (49)	961	1651	(3058)
12W TY 0	DESSA	23 AUG - 01 SEP	10	39	90 (46)	957	2328	(4311)
13W TY P	PAT	27 AUG - 01 SEP	6	23	95 (49)	961	1337	(2476)
14W TS R		28 AUG - 01 SEP	5	19	55 (28)	982	1310	(2426)
02C TY S		30 AUG - 08 SEP	10	34	80 (41)	974	1822	(3374)
15W TY T	ress	01 SEP - 06 SEP	7	22	75 (39)	967	1470	(2722)
16W TS V		15 SEP - 18 SEP	4	14	50 (26)	992	1630	(3019)
	VINONA	19 SEP - 22 SEP	4	11	50 (26)	990	518	(959)
18W TY A		28 SEP - 02 OCT	5	16	70 (36)	970	705	(1306)
	BRENDA	29 SEP - 05 OCT	. 7	25	90 (46)	964	1551	(2872)
	CECIL	12 OCT - 16 OCT	5	16	100 (51)	944	1034	(1915)
21W STY D		13 OCT - 22 OCT	10	34	150 (77)	897	3074	(5693)
	ELLIS	16 OCT - 20 OCT	5	19	50 (26)	995	1046	(1937)
23W TY F		23 OCT - 01 NOV	10	39	100 (51)	960	1849	(3424)
	GORDON	20 NOV - 26 NOV	7	23	45 (23)	997	797	(1476)
25W TY H		17 DEC - 24 DEC	8	26	100 (51)	948	1444	(2674)
26W TS I	RVING	18 DEC - 21 DEC	4	14	60 (31)	994	806	(1493)
		1985 TOTALS:	127*	715				

*	OVERLAPPING	DAYS	INCLUDED	ONLY	ONCE	IN	SUM.	

TABLE 3-2. 1985 SIGNIFICANT TROPICAL CYCLONES															
WESTERN NORTH PACIFIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	(1959-1 AVERAGE	
TROPICAL DEPRESSIONS	0	0	0	0	0	1	0	0	0	0	0	0	1	3.7	99
TROPICAL STORMS	2	0	0	0	0	0	0	2	2	1	1	1	9	9.9	268
TYPHOONS	0	0	0	0	1	2	1	5	3	4	0	1	17	17.3	468
ALL TROPICAL CYCLONES	2	0	0	o	1	3	1	7	5	5	1	2	27	30.9	835
1959 - 198: AVERAGE	.6	.3	.7	.8	1.3	2.0	4.7	6.3	5.7	4.6	2.6	1.4	30.9		
CASES	15	8	18	22	34	54	128	170	153	124	71	38	835		
FORMATION ALERTS: 26 of 39 Formation Alerts developed into significant tropical cyclones. Tropical Cyclone Formation Alerts were issued for all except one of the significant tropical cyclones that developed in 1985.															
WARNINGS:	•														
	Number of calendar warning days with two tropical cyclones in region: 32														
Number of calendar warning days with three or more tropical cyclones in region:															
				_											

										•				
22	TABLE 3-3.													
	FREQUENCY OF TYPHOONS BY MONTH AND YEAR													
ı	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOA	DEC	TOTAL
ı	(1945-1958) AVERAGE	.4	.1	.3	.4	.7	1.1	2.0	2.9	3.2	2.4	2.0	. 9	16.3
I	1959	0	0	0	1	0	0	1	5	3	3	2	2	17
	1960	0	0	0	1	0	2	2	8	0	4	1	1	19
	1961	ő	3	ĭ	ō	2	î	3	3	5	3	i	î	20
	1961	0	ő	0	1	2	Ô	5	7	2	4	3	0	24
	1962	Ö	0	0	1	1	2	3	3	3	4	0	2	19
H	1964	õ	ŏ	ő	ō	2	2	6	3	5	3	4	í	26
		•	•	•	-	_	_	_	_	-			_	
8	1965	1	0	0	1	. 2	2	4	3	5	2	1	0	21
	1966	0	0	0	1	2	1	3	6	4	2	0	1	20
	1967	• •	0	1	1	0 .	1	3	4	4	3	3	0	20
	1968	Đ	0	0	1	1	1	1	4	3	5	4	0	20
	1969	1	0	0	1	C	0	2	3	2	3	1	0	13
ı	1970	0	1	0	0	0	1	0	4	2	3	1	0	12
1	1971	0	0	0	3	1	2	6	3	5	3	1	0	24
•	1972	1	0	0	0	1	1	4	4	3	4	2	2	22
	1973	0	0	0	0	0	0	4	2	2	4	0	0	12
ı	1974	0	0	0	0	1	2	1	2	3	4	2	0	15
	1975	1	0	0	0	0	0	1	3	4	3	2	0	14
	1976	1	0	0	1	2	2	2	1	4	1	1	0	15
	1977	0	0	0	0	0	0	3	0	2	3	2	1	11
•	1978	0	0	0	1	0	0	3	2	4	3	2	0	15
	1979	1	0	1	1	0	0	2	2	3	2	1	1	14
	1980	0	0	0	0	2	0	3	2	5	2	1	0	15
	1981	0	0	1	0	0	2	2	2	4	1	2	2	16
	1982	0	0	2	0	1	1	2	5	3	3	1	1	19
	1983	0	0	0	0	0	0	3	2	1	4	2	0	12
	1984	O	0	0	0	0	0	4	2	1	5	3	1	16
	1985	0	0	0	0	1	2	1	5	3	4	0	ì	17
	(1959 - 1985)													
	AVERAGE	.2	.04	.2	.6	.8	.9	2.7	3.3	3.1	3.1	1.6	.6	17.3
	CASES	6	1	6	15	21	25	74	90	85	85	43	17	468

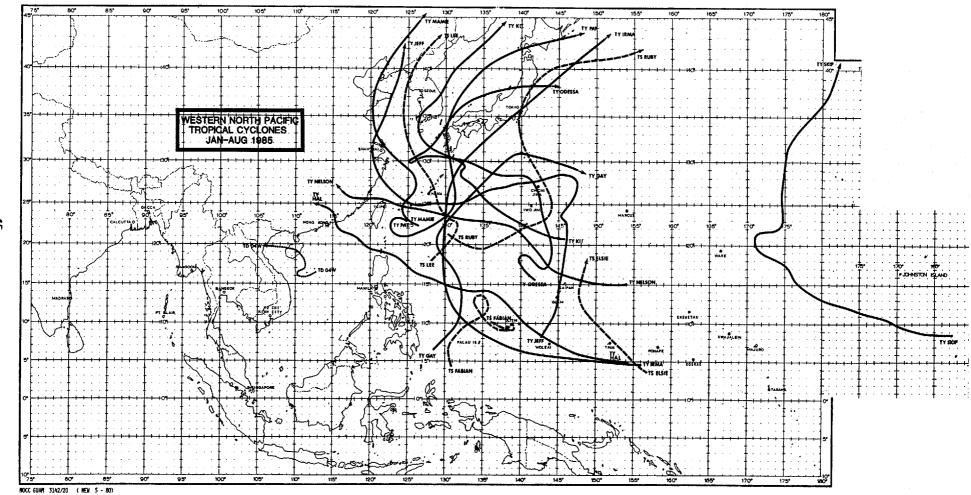
TABLE 3-4. YEAR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC TOTAL														
YEAR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC TOTAL (1945-1958) AVERAGE .4 .1 .4 .5 .8 1.3 3.0 3.9 4.1 3.3 2.7 1.1 21.6 1959 0 1 1 1 0 0 3 6 6 4 2 2 26 1960 0 0 0 1 1 3 3 10 3 4 1 1 27 1961 1 1 1 1 3 2 5 4 6 5 1 1 31 1 1 3 2 5 4 6 5 1 1 31 1 3 2 3 0 3 25 1 1 3 4 3 5 5 0 3 25 1 <t< td=""><td>TABLE 3-4.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	TABLE 3-4.													
(1945-1958) AVERAGE .4 .1 .4 .5 .8 1.3 3.0 3.9 4.1 3.3 2.7 1.1 21.6 1959 0 1 1 1 0 0 0 3 6 6 4 2 2 2 26 1960 1960 0 0 0 0 1 1 1 3 3 3 10 3 4 1 1 27 1961 1 1 1 1 1 3 2 5 4 6 5 1 1 31 1962 0 1 0 1 2 0 6 7 3 5 3 2 30 1963 0 0 0 1 1 3 4 3 5 5 0 3 25 1964 0 0 0 0 0 2 2 7 7 9 7 6 6 1 40 1965 2 2 1 1 2 2 3 5 6 7 2 2 1 34 1966 0 0 0 0 1 2 1 5 8 7 3 2 1 30 1967 1 0 2 1 1 1 1 6 8 7 4 3 1 35 1968 0 0 0 1 1 2 1 5 8 7 4 3 1 35 1969 1 0 1 1 1 0 0 3 4 3 3 5 6 4 0 27 1969 1 0 1 1 1 3 8 3 3 6 4 0 27 1969 1 0 1 1 0 0 0 2 2 6 4 5 4 0 24 1971 1 1 0 1 3 4 3 3 3 2 5 8 4 6 6 1 40 27 1972 1 0 0 0 1 3 4 3 3 5 6 7 2 2 2 1 30 1973 0 0 0 0 1 2 1 5 5 8 7 3 2 1 19 1974 1 0 1 1 3 4 2 8 4 6 4 2 0 35 1975 1 0 0 0 0 0 0 0 7 5 2 4 3 0 21 1974 1 0 1 1 1 4 4 5 5 4 4 2 32 1975 1 1 0 0 0 0 0 0 2 2 4 5 5 3 0 20 1976 1 1 0 2 2 2 2 4 4 5 5 5 3 0 20 1977 1 1 0 0 1 0 0 0 0 2 2 4 5 5 1 1 2 25 1977 0 0 1 0 0 1 0 0 0 2 2 2 6 4 5 5 1 1 2 25 1977 0 0 1 0 1 1 0 0 0 2 2 2 4 5 5 1 1 2 25 1977 0 0 1 0 1 0 0 1 4 1 5 4 2 5 5 1 1 2 26 1980 0 0 0 1 2 0 2 5 7 4 2 3 2 22 1980 0 0 0 1 2 0 2 5 7 4 2 3 2 28 1982 0 0 0 3 0 1 3 4 5 5 5 3 1 2 26 (1959-1985) AVERAGE .5 .3 .5 .8 1.1 1.6 4.3 5.4 4.9 4.1 2.4 1.2 27.3		FREQUE	NCY O	F TRO	PICAL	STOR	MS AN	D TYP	HOONS	BY M	ONTH	AND Y	EAR	
AVERAGE 1.4	<u>YEAR</u>	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1960		.4	.1	.4	. 5	.8	1.3	3.0	3.9	4.1	3.3	2.7	1.1	21.6
1961	1959	0	1	1	1	0	0	. 3	6	6	4	2	2	26
1966 0 0 0 1 2 1 1 1 6 8 7 3 2 1 30 1967 1 0 0 2 1 1 1 1 6 8 7 4 3 1 35 1968 0 0 0 1 1 1 1 3 8 3 6 4 0 27 1969 1 0 1 1 0 0 0 3 4 3 3 2 1 19 19 1970 0 1 0 1 3 4 2 8 4 6 4 2 0 35 1972 1 1 0 0 1 3 4 2 8 4 6 4 2 0 35 1972 1 1 0 0 0 1 3 6 5 4 5 2 3 30 1973 0 0 0 0 0 0 0 0 7 5 2 4 3 0 21 1974 1 0 1 1 1 1 4 4 5 5 5 4 4 2 32 1974 1 0 1 1 1 1 4 4 5 5 5 4 4 2 32 1976 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1961 1962 1963	1 0 0	1 1 0	1 0 0	1 1 1	3 2 1	2 0 3	5 6 4	4 7 3	6 3 5	5 5 5	1 3 0	1 2 3	31 30 25
1971	1966 1967 1968	0 1 0	0 0 0	0 2 0	1 1 1	2 1 1	1 1 1	5 6 3	8 8 8	7 7 3	3 4 6	2 3 4	1 1 0	30 35 27
1976 1 1 0 2 2 2 4 4 5 1 1 2 25 1977 0 0 1 0 0 1 4 1 5 4 2 1 19 1978 1 0 0 1 0 3 4 7 5 4 3 0 28 1979 1 0 1 1 1 1 0 4 2 7 3 2 2 24 1980 0 0 0 1 1 4 1 4 2 6 4 1 1 24 1981 0 0 1 2 0 2 5 7 4 2 3 2 28 1982 0 0 3 0 1 3 4 5 5 3 1 1 26 1983 0 0 0 0 0 0 1 3 4 5 5 3 1 1 26 1983 0 0 0 0 0 0 1 3 5 5 5 3 1 2 26 (1959-1985) AVERAGE .5 .3 .5 .8 1.1 1.6 4.3 5.4 4.9 4.1 2.4 1.2 27.3	1971 1972 1973	1 1 0	0 0 0	1 0 0	3 0 0	1 0	2 3 0	8 6 7	4 5 5	6 4 2	4 5 4	2 2 3	0 3 0	35 30 21
1981 0 0 1 2 0 2 5 7 4 2 3 2 28 1982 0 0 3 0 1 3 4 5 5 3 1 1 26 1983 0 0 0 0 0 0 1 3 5 2 5 5 2 23 1984 0 0 0 0 0 0 2 5 5 4 7 3 1 27 1985 2 0 0 0 1 2 1 7 5 5 1 2 26 (1959-1985) AVERAGE .5 .3 .5 .8 1.1 1.6 4.3 5.4 4.9 4.1 2.4 1.2 27.3	1976 1977 1978	1 0 1	1 0 0	0 1 0	2 0 1	0	2 1 3	4 4 4	4 1 7	5 5 5	1 4 4	1 2 3	2 1 0	25 19 28
(1959-1985) AVERAGE .5 .3 .5 .8 l.1 l.6 4.3 5.4 4.9 4.1 2.4 l.2 27.3	1981 1982 1983	0	0	1 3 0	2 0 0	0 1 0	2 3 1	5 4 3	7 5 5	4 5 2	2 3 5	3 1 5	2 1 2	28 26 23
AVERAGE .5 .3 .5 .8 1.1 1.6 4.3 5.4 4.9 4.1 2.4 1.2 27.3	1985	2	0	0	0	1	2	1	7	5	5	1	2	26
CASES 14 7 14 21 30 44 117 147 131 112 66 33 736		.5	. 3	.5	.8	1.1	1.6	4.3	5.4	4.9	4.1	2.4	1.2	27.3
	CASES	14	7	14	21	30	44	117	147	131	112	66	33	736

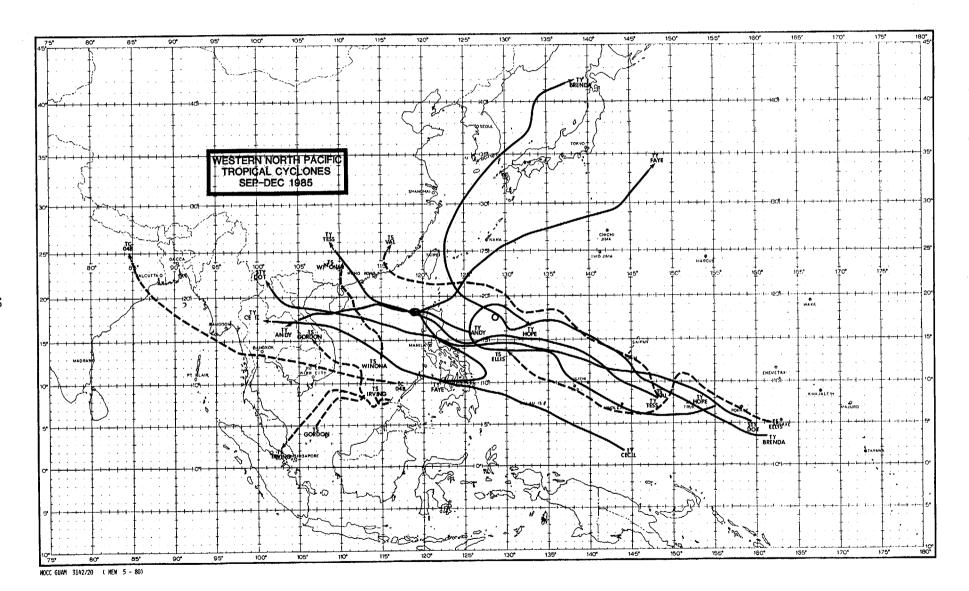
TABLE 3-5.

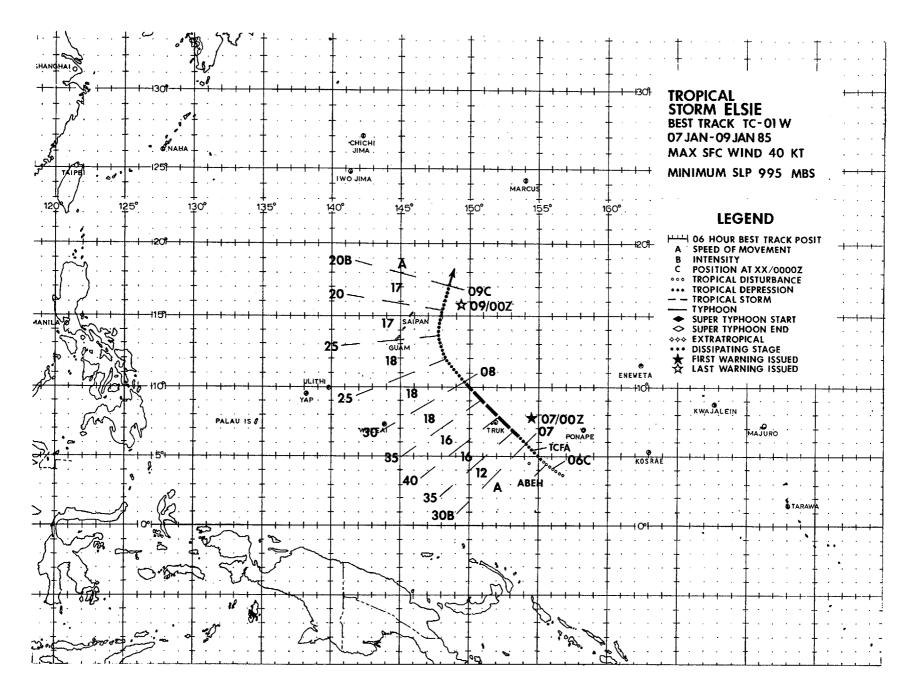
FORMATION ALERT SUMMARY

WESTERN NORTH PACIFIC

YEAR	NUMBER OF ALERT SYSTEMS	ALERT SYSTEMS WHICH BECAME NUMBERED TROPICAL CYCLONES	TOTAL NUMBERED TROPICAL CYCLONES	DEVELOPMENT RATE
1975	34	25	25	74%
1976	34	25	25	74%
1977	26	20	21	77%
1978	32	27	32	84%
1979	27	23	28	85%
1980	37	28	28	76%
1981	29	28	29	97%
1982	36	26	28	72%
1983	31	25	25	81%
1984	37	30	30	81%
1985	39	26	27	67%
(1975-1985) AVERAGE	32.9	25.7	27.1	78%
CASES	362	283	298	







Tropical Storm Elsie, the first tropical cyclone of the 1985 season, was also the first tropical storm to develop during January in six years. Warnings were issued for only two days and it never intensified beyond 40 kt (21 m/s).

During the first week of January the near-equatorial trough was quite active, and extended from the southern Philippines southeast to the vicinity of the Equator and 160E. Embedded in this trough were two weak circulations, one southwest of Guam which would later develop into Tropical Storm Fabian and another southeast of Guam which would eventually develop into Elsie. Enhanced convective activity persisted throughout the region.

The cloud system that was to become Elsie first appeared on 4 January as an area of weak convection southwest of Pohnpei (Ponape WMO 91348). The convection persisted through the 4th, and on the 5th began to increase in strength and organization. At 0000Z on the 6th, analysis of satellite imagery gave the first indications that a low-level circulation center was developing. Sparse synoptic data up to this time had only indicated that a very broad 10 to 15 kt (5 to 8 m/s) cyclonic circulation was present. The persistence and improved organization of the convection resulted in the disturbance being mentioned in the 060600Z Significant Tropical Weather Advisory (ABEH PGTW). The disturbance was assessed as having a "fair" potential for further development (meaning that it was considered likely that a TCFA would be issued during the next 24 hours). Indeed, this was the case.

Analysis of satellite imagery during the next ten hours showed continued development, with Dvorak intensity analysis of the 061600Z imagery estimating surface winds of 25 kt (13 m/s). This was confirmed by a late 061200Z ship report near the Mortlock Islands (Satawan Atoll WWO 91338) which observed northwest winds of 30 kt (15 m/s). As a

result, a TCFA was issued at 061700Z.

Just prior to 070000Z, the first aircraft reconnaissance mission was conducted into the disturbance. It located a 25 kt (13 m/s) circulation center at 062238Z approximately 60 nm (111 km) northeast of the Mortlock Islands near 5.8N 154.4E. As the WC-130 exited to the southwest a short time later, a small area of 30 kt (15 m/s) surface winds was observed. This prompted the first warning on Elsie, as a 30 kt (15 m/s) tropical depression, valid at 070000Z.

Elsie was upgraded to a 35 kt (18 m/s) tropical storm at 070600Z based on synoptic data received from the Mortlock Islands. The tropical cyclone briefly attained an intensity of 40 kt at 071200Z.

From the time Elsie was detected until the time JTWC went to warning status, the disturbance had moved to the northwest at about 7 kts (13 km/hr). After 070000Z, however, Elsie accelerated to the northwest as it moved around the western periphery of the subtropical ridge, passing east of Truk (WMO 91334) at about 071000Z. As Elsie moved further north (Figure 3-01-1) it encountered strong southerly winds aloft from an upper-level anticyclone south of Wake Island (WMO 91245). These winds sheared off the central convection. As a result, Elsie quickly lost all organization and rapidly weakened. Its low-level circulation could not be located on satellite imagery or by aircraft reconnaissance after 082100Z. The final warning was issued at 090000Z.

As Elsie passed east of Guam it did enhance the tradewinds, with gusts to 31 kt (16 m/s) observed at the U. S. Naval Oceanography Command Center/Joint Typhoon Warning Center building on Nimitz Hill. After Elsie dissipated, a secondary circulation formed in its wake near Guam and persisted for two days until it also moved to the northeast and dissipated.

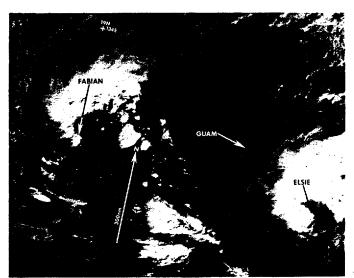
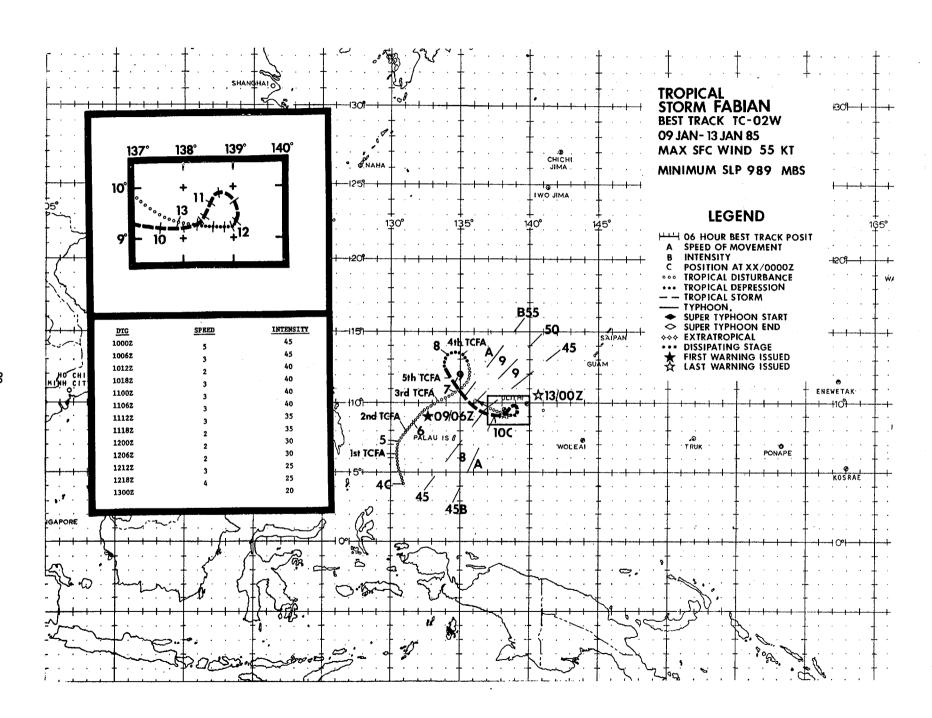


Figure 3-01-1. Tropical Storm Elsie weakening southeast of Guam. Later, strong upper-level winds north of Elsie sheared away the central convection. Rapid weakening and dissipation quickly followed. (The disturbance that would soon develop into Tropical Storm Fabian is located to the northwest of Elsie) (0800472 January DMSP visual imagery).



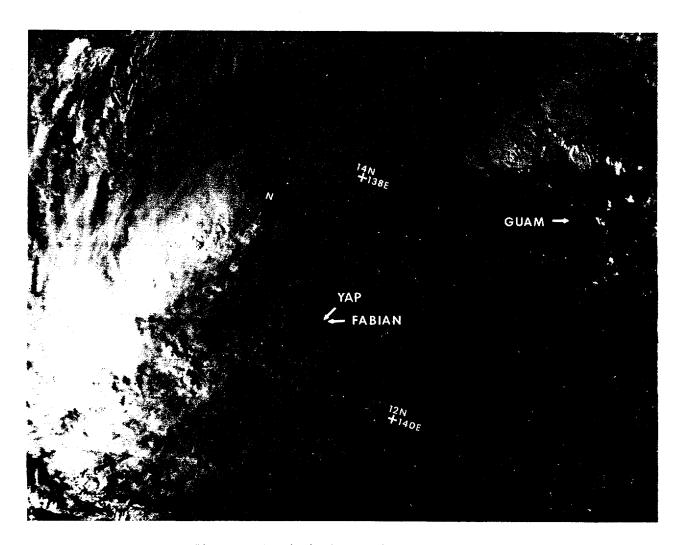
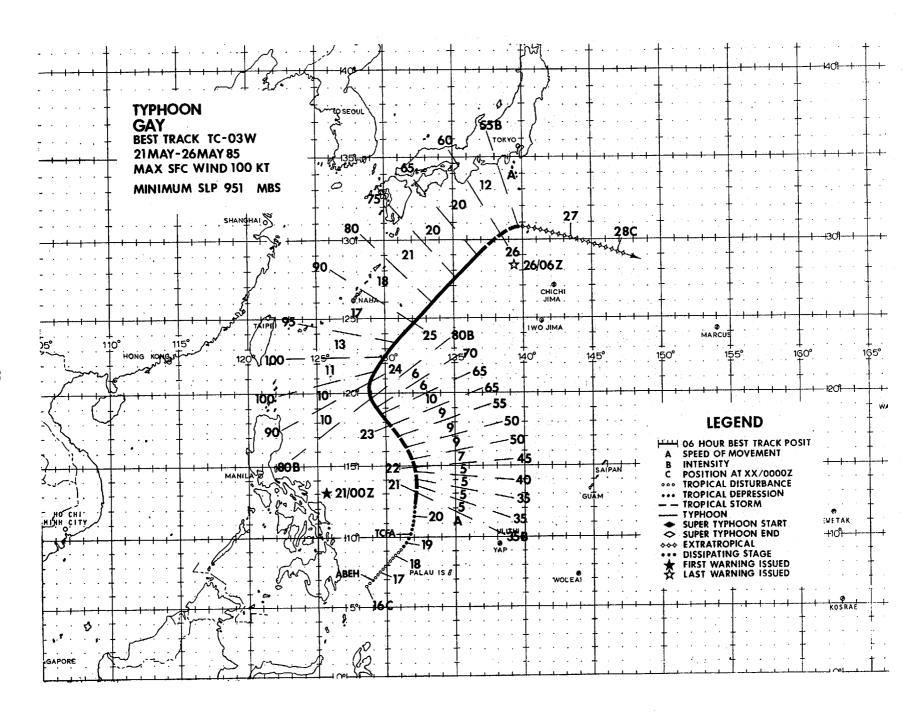


Figure 3-02-1. The development of Tropical Storm Fabian marked the first time in twenty years that two tropical storms formed in WESTPAC during January. Fabian developed at the western end of the near-equatorial trough, and as a result had major interactions with the northeast monsoon. Not surprisingly, the strongest winds were consistently observed in the tropical cyclone's western semicircle, where the gradient between the low central pressure of Fabian and the higher pressures of the Siberian anticyclone was the greatest. The [above] satellite imagery shows Fabian, as a weakening Tropical Storm, with a well-defined low-level circulation. Fabian's low-level circulation was exposed for much of its lifetime due to strong upper-level winds from the south which sheared the convection to the north. The Tropical Storm passed very close to Yap (WMO 91413) and caused considerable crop damage on some of the outer islands (1006307 January NOAA visual imagery).



Typhoon Gay was the first tropical cyclone to reach typhoon intensity in 1985. It was also the season's first to enter the mid-latitude westerlies and recurve. The formation of Gay followed more than four months of inactivity in WESTPAC and marked the start of the 1985 summer tropical cyclone season.

The tropical disturbance that eventually intensified into Typhoon Gay was first detected by synoptic data on 16 May as a weak surface circulation 380 nm (704 km) west-southwest of Koror (WMD 91408). The convection in this area appeared to be random. Another area of disorganized convection was developing further east along 139E under an area of upper-level diffluence associated with a westward moving upper-level anticyclone. To the north, tropical upper-tropospheric trough (TUTT) extended from the Volcano Islands southwest to just east of the Philippines. Figure 3-03-1 shows the movements and locations of the upper-level anticyclonic and low-level cyclonic circulations over a five day period as Gay went through its formative stages. Although the upper-level and low-level circulations became nearly vertically aligned on 19 May, the disturbance still struggled for two more days before reaching tropical storm intensity. The most probable cause for this slow intensification was the close proximity of the TUTT to the north, which restricted the upper-level outflow to the northwest (Figure 3-03-2).

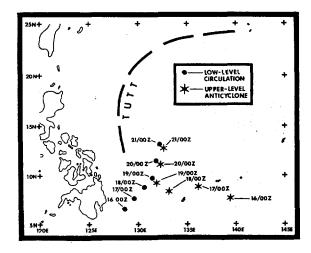


Figure 3-03-1. These plots show the positions and movements of the upper-level anticyclonic and low-level cyclonic circulations during Gay's formative period. The juxtaposition of these upper- and low-level circulations on 19 May usually indicates the tropical cyclone is reaching maturity. However, the presence of the TUTT to the north and northwest is thought to have impeded development through the 21st.

Between 0000Z and 0600Z on the 19th two different tactical DMSP sites, based upon Dvorak intensity analyses of satellite imagery, estimated that the disturbance had 30 kt (15 m/s) surface winds. increased intensity estimates were founded on the more organized intense convection associated with the upper-level circulation center, which was then displaced approximately 50 nm (93 km) southeast of the surface center. These satellite reconnaissance inputs prompted a TCFA to be issued at 190800Z. At the time of the TCFA, sparse synoptic data near the disturbance center could not confirm the satellite derived intensities. However, synoptic data on the periphery of the disturbance implied that at least a 15 kt (8 m/s) circulation was present. Until this time, the only reported stronger wind was the gradient-level wind at Koror (WMO 91408) which increased from 9 kt (5 m/s) at 171200Z to 27 kt (14 m/s) at 180000Z as the disturbance passed west of the island late on the 17th. For the remainder of the 19th and into the 20th, with the TUTT continuing to exert influence on the disturbance, there was no significant improvement in the tropical cyclone's organization. As a result, the TCFA was reissued at 200700Z.

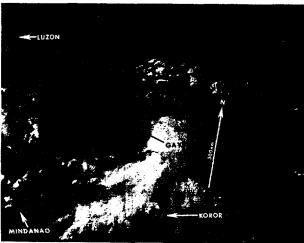


Figure 3-03-2. The tropical disturbance, which would later develop into Typhoon Gay, is interacting with the upper-level trough to the northwest. The outflow is restricted on the northwest side of the tropical cyclone (200518Z May NOAA visual imagery).

The first warning on Gay was issued at 210000Z after visual satellite imagery showed the convection was developing over the low-level circulation and Dvorak intensity analysis estimated that 35 kt (18 m/s) surface winds were present. The presence of the upper-level trough and its restrictive influence on outflow aloft strongly influenced the intensity forecasts on the first nine JTWC warnings. Gay was expected to strengthen only slowly, then maintain

intensity or weaken slightly in the extended outlook periods. These scenarios appeared valid based on satellite derived intensity analyses and forecasts, and on expectations that the upper-level trough would persist. Post-analysis revealed these intensities were consistently low. This was primarily due to the lack of any aircraft reconnaissance or synoptic data confirming the intensity, and partially due to the TUTT weakening faster than expected.

Gay attained typhoon intensity at about 230000Z just prior to the first aircraft reconnaissance penetration at 230830Z. The Aerial Reconnaissance Weather Officer (ARWO) reported Gay as very compact, with 65 kt (33 m/s) surface winds surrounding a 15 mm (28 km) diameter eye, and a 971 mb minimum sea-level pressure (MSLP). Gay's intensification to typhoon strength can be attributed to the significant weakening of the TUTT on the 22nd and to its tight circulation. In this case, the Typhoon's small size allowed it to mature in an area where a larger circulation would have interacted unfavorably with the surrounding atmosphere. Consequently, Gay became vertically stacked and developed a ragged eye while moving northwest with the mid-level steering flow around the western periphery of the subtropical ridge. This set the stage for Typhoon Gay's final phase.

By 230000Z, with a frontal boundary and associated mid-latitude trough quasi-stationary across the Ryukyu Islands, a recurvature scenario seemed most probable. JTWC incorporated this into the warnings and called for recurvature along the subtropical ridge axis near 22N in 48 hours. This scenario was ahead of all forecast aids (Figure 3-03-3), especially the OTCM (One-way Interactive Tropical Cyclone Model), JTWC's best forecast aid. With Gay continuing to intensify and move northwest, Kadena AB (MMO 47931) set Condition of Readiness III at 232230Z. Fortunately, Gay came under the influence of the mid-latitude westerlies and recurved earlier than forecast passing well south of Okinawa. Just prior to Gay's recurvature, another mid-lati-

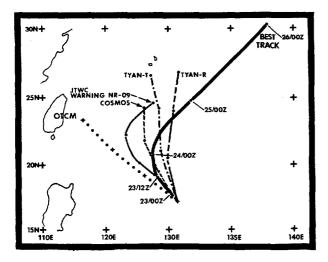


Figure 3-03-3. These plotted forecast aids were available to the Typhoon Duty Officer (TDO) at the time the first recurvature forecast was issued. OTCM, JTWC's best aid, failed to predict the recurvature. OTCM guidance repeatedly failed to forecast recurvature, in this case, until after it had actually occurred!

tude mid-level trough began to dig unseasonably southward across eastern China northwest of Gay. This apparently increased the upper-level outflow ahead of the trough and may be the reason why Gay continued to intensify for 6 to 12 hours after recurvature. Gay reached a peak intensity of 100 kt (51 m/s) between 240600Z and 241200Z (Figure 3-03-4). This intensification correlates well with the studies by Riehl (1972) and Guard (1983) on the intensification of recurving tropical cyclones in WESTPAC.

After recurvature, Gay started a gradual acceleration to the northeast with satellite imagery indicating interaction with the frontal boundary beginning at 2412002. By 0600Z on the 25th, Gay was entraining modified polar air into the low-level circulation and the eyewall was disintegrating. Extratropical transition had begun and the intense central convection started displacing outward. A steady decrease in convective organization and intensity continued as the mid-latitude trough moved rapidly eastward from the Yellow Sea over Japan. Gay was downgraded to a Tropical Storm at 260000Z.

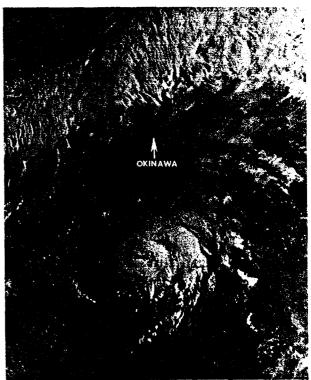


Figure 3-03-4. This early morning picture reveals Typhoon Gay near maximum intensity. (Note Gay's developing eye). The proximity of the frontal boundary to the north led to a recurvature forecast, overruling the the incorrect guidance from the forecast aids (2321272 May DMSP visual imagery).

Figure 3-03-5 shows the effect of the strong vertical wind shear on the remaining convection from the storm's circulation. Gay completed extratropical transition at 260600Z when the final warning was issued.

After completing extratropical transition, the nearly convection free low-level circulation drifted eastward and eventually dissipated. There were no reports of lives lost or damage to shipping from Typhoon Gay.

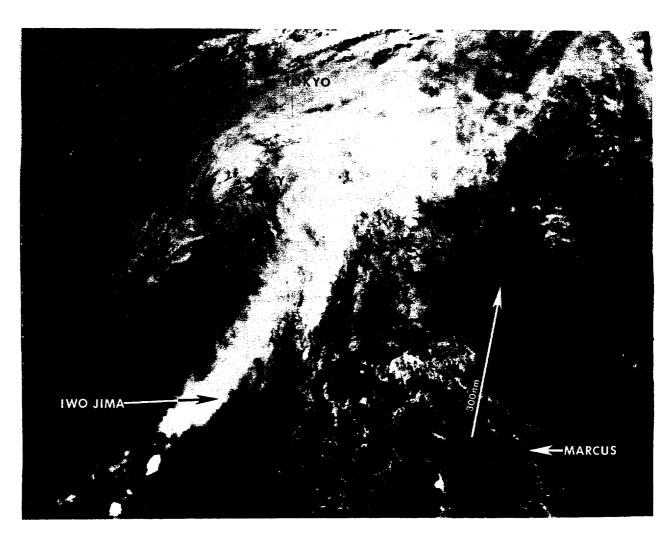


Figure 3-03-5. As Gay completes extratropical transition, the upper-level westerlies are shearing the convection away to the northeast of the low-level circulation center (260413Z May NOAA visual imagery).

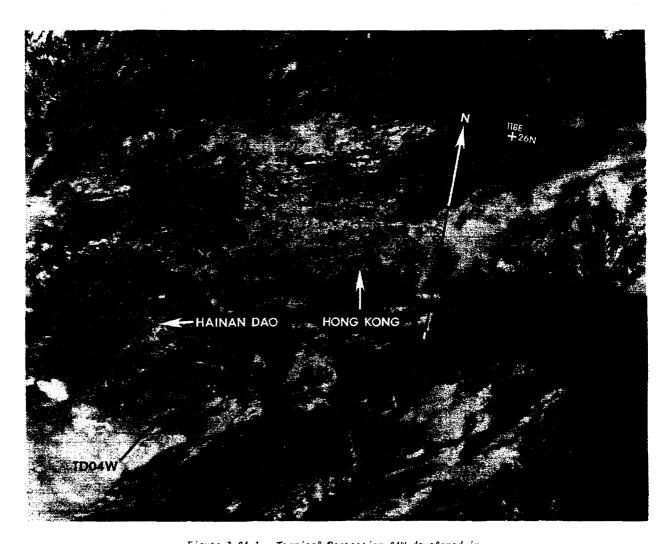


Figure 3-04-1. Tropical Depression 04W developed in the northern end of the monsoon trough in late June and remained embedded in the trough throughout its lifetime. Due to strong vertical wind shear aloft from the northeast, the low-level circulation center was often observed near the northeast edge of the convection (see the above imagery). This strong shearing environment prevented Tropical Depression 04W from intensifying above 30 kt [15 m/s] [1901532 June DMSP visual imagery).

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Typhcon Hal, the fifth tropical cyclone of the 1985 WESTPAC season, developed from a southwest monsoon trough disturbance. Hal caused considerable forecast difficulties because JTWC's primary forecast aid, OTCM, was unable to resolve a narrow mid-level subtropical ridge due to its relatively coarse grid spacing.

After Typhoon Gay completed extratropical transition on 26 May, a springtime weather pattern returned to the tropical western North Pacific. A strong tropical upper-tropospheric trough (TUTT) became established over most of the area, resulting in strong surface ridging from the Dateline westward to the Malay Peninsula and a large-scale suppression of convective activity. Transient mid-latitude short wave troughs passed north of a quasi-stationary Polar front that extended from near Hainan Island to about 300 nm (556 km) north of Minami-Torishima (MMO 47991). By 1 June, a weak low-level southwest monsoon flow had returned to the South China Sea.

There was a significant surge in the southwest monsoon commencing on 8 June, and by 12 June the low-level southwest monsoon flow extended as far eastward as Guam (WMO 91212).

Typhcon Hal was first detected as a weak tropical disturbance in the near-equatorial trough at 05N 154E on 11 June. The disturbance showed poor organization as it moved slowly westward during the next three days. Most of the intense convection was located west of the low-level circulation center and showed signs of cross-equatorial outflow after 14 June. On the 15th, the disturbance began moving west-northwest and showed signs of increasing organization. By 18 June, the disturbance had merged with the strong low-level southwest monsoon flow and had taken on the characteristics of a monsoon trough disturbance. As shown in Figure 3-05-1, the disturbance was sheared from the north by upper-level flow which left a broad, weak low-level circulation in

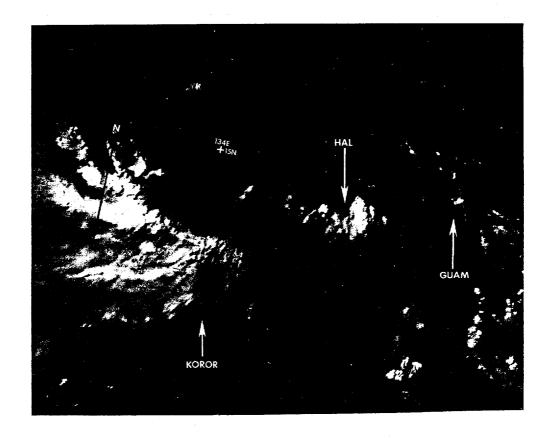


Figure 3-05-1. The tropical disturbance that developed into Typhoon Hal with strong upper-level shear from the north confining the intense convection to the south semicircle. Only scattered cumulus are evident in the north semicircle. The low-level circulation is in the form of a broad trough at this time (1805112 June NOAA visual imagery).

the north semicircle with scattered cumulus clouds. The intense convection was located in the south semicircle where the upper-level flow was divergent toward the southwest. By 1800Z on the 19th, satellite imagery indicated that the upper-level shear from the north had decreased and that a tropical cyclone scale low-level circulation had formed. The system had been the subject of a TCFA for 40-hours when the first warning was issued at 191800Z. Once convection started to appear in the north semicircle and the system showed signs of cirrus outflow toward the north, intensification proceeded quickly. By 200600Z, only 12-hours after

the first warning, the cyclone had reached typhoon intensity. Figure 3-05-2 shows a plot of the aircraft reconnaissance mission flown at that time. Notice the location of the maximum surface winds. In this case, the maximum surface winds are located approximately 90 nm (167 km) from the center of the cyclone. This large separation is a characteristic of many cyclones that evolve from strong monsoon troughs. Typhoon Hal continued intensifying during the next 24-hours and developed a large, ragged eye as shown in Figure 3-05-3. This feature is also a characteristic of this type of cyclone. The satellite picture also shows a TUTT cell located east of

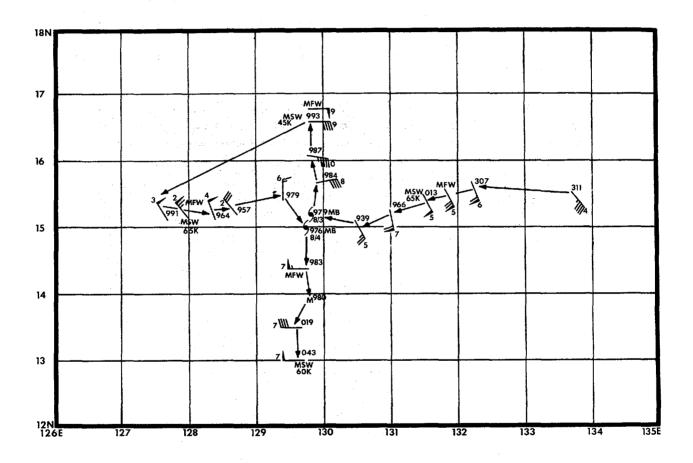


Figure 3-05-2. Plot of aircraft reconnaissance data from 2005007 to 2010007 June showing the maximum surface winds located approximately 90 nm [167 km] from the cyclone center. "MFW" represents the maximum observed flight level winds and "MSW" represents the maximum surface winds observed.



Figure 3-05-3. Typhoon Hal with a large, ragged eye. Nost of the intense convection is in the south semicircle. (2101092 June DMSP visual imagery).

Hal that enhanced the upper-level outflow pattern in that direction. Figure 3-05-4 shows Typhoon Hal near the time of its maximum intensity.

Except for a few short-term variations, Hal moved in a west-northwestward direction during its five-day lifetime as a tropical storm and typhoon. This is interpreted in post-analysis as a normal south-of-the-subtropical ridge track movement. Figure 3-05-5 shows the 500 mb wind pattern at

201200Z, 18-hours after the first warning was issued, but still representative of the environment present throughout Hal's lifetime. Note the narrow subtropical ridge north of Hal that extends westward towards China. Based on just this pattern and assuming that it would persist, a forecast track of west-northwest would have been a good choice. However, JTWC's primary forecast guidance, the OTCM (One-way Interactive Tropical Cyclone Model)

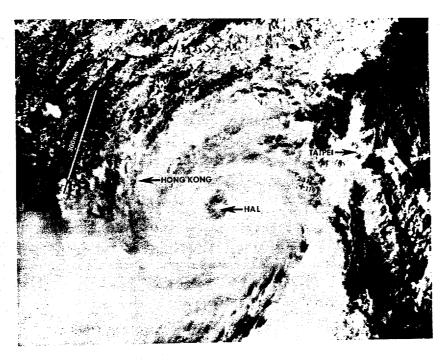


Figure 3-05-4. Typhoon Hal near the time of maximum intensity (2305592 June NOAA visual imagery).

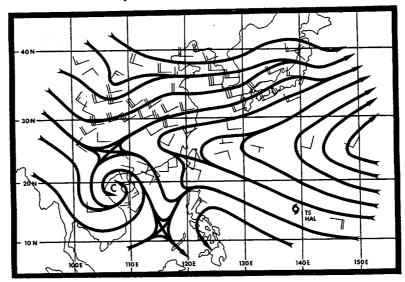


Figure 3-05-5. The 2012007 June 500 mb analysis showing the narrow mid-level subtropical ridge north of Hal. This ridge kept Hal from taking a more northerly course and entering the westerlies, contrary to the guidance provided by OTCM.

consistently indicated a more northward, and even a recurving northeastward, track. Figure 3-05-6 is a plot of the OTCM forecast tracks starting with the one on which the first warning was based. JTWC followed the guidance offered by the OTCM, and as a result, the forecast tracks were consistently north of Hal's actual track. In post-analysis it is apparent that OTCM was unable to resolve the narrow mid-level ridge because of the relatively coarse grid size (205 km) that the model uses. The flow that OTCM "saw" influencing the movement of Hal was the westerlies on the north side of the ridge. This resulted in the northward and recurving component in the OTCM forecasts. This situation will likely arise again in the future years, and will be closely watched for by the forecasters at JTWC as a result of this experience.

The Philippine island of Luzon experienced the strongest effects as the center of Typhoon Hal passed just 30 nm (56 km) off the north coast and westward through the Luzon Straits. The death toll was 23 persons with nine others reported as missing. There was widespread flooding and crop damage. Total damage was estimated at more than \$10 million. Eight crewmen of the US Navy frigate Kirk (FF-1087) were injured when a large wave crashed over the bow. The ship was operating in the South China Sea about 5 nm (9 km) southwest of Subic Bay. High winds caused superficial damage to the hull of the destroyer USS Oldendorf (DD-972) when a drifting, unmanned barge struck the ship while it was moored at Subic Bay. Strong winds tore the barge from its mooring in mid-harbor shortly before the incident occurred. As

Typhoon Irma approached from the east, Subic Bay received 30 in (762 mm) of rainfall during the period 26-28 June as a result of the strong low-level southwest monsoon flow that continued over the area after Hal had moved into China and dissipated as a significant tropical cyclone.

Taiwan was also affected by Typhoon Hal as it caused strong winds and heavy rains. Two people died, 18 injured, and five people listed as missing as a result of the typhoon. Eastern Taiwan experienced the heaviest rainfall, with almost 9 inches (229 mm) being reported. The heavy rainfall caused flooding that was responsible for most of the death, injury, and damage.

Typhoon Hal made landfall approximately 75 nm (139 km) east-northeast of Hong Kong (WMO 45005) at 240500Z. Maximum mean hourly wind speed reported at the Royal Observatory was 22 kt (11 m/s) from the west-northwest, with a peak gust to 49 kt (25 m/s). A gust to 50 kt (26 m/s) was recorded at the Hong Kong International Airport (WMO 45007). Some minor injuries were reported and the property damage was slight. All modes of transportation were disrupted on 23 and 24 June. Heavy rain on 25 and 26 June, after Hal had moved inland, caused numerous landslides in the Hong Kong area with only a few minor injuries.

Over mainland China, 13 more people died with some 40,000 homes and 321,000 acres (130,000 hectares) of crops damaged.

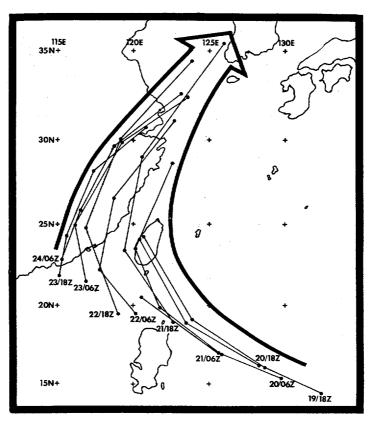
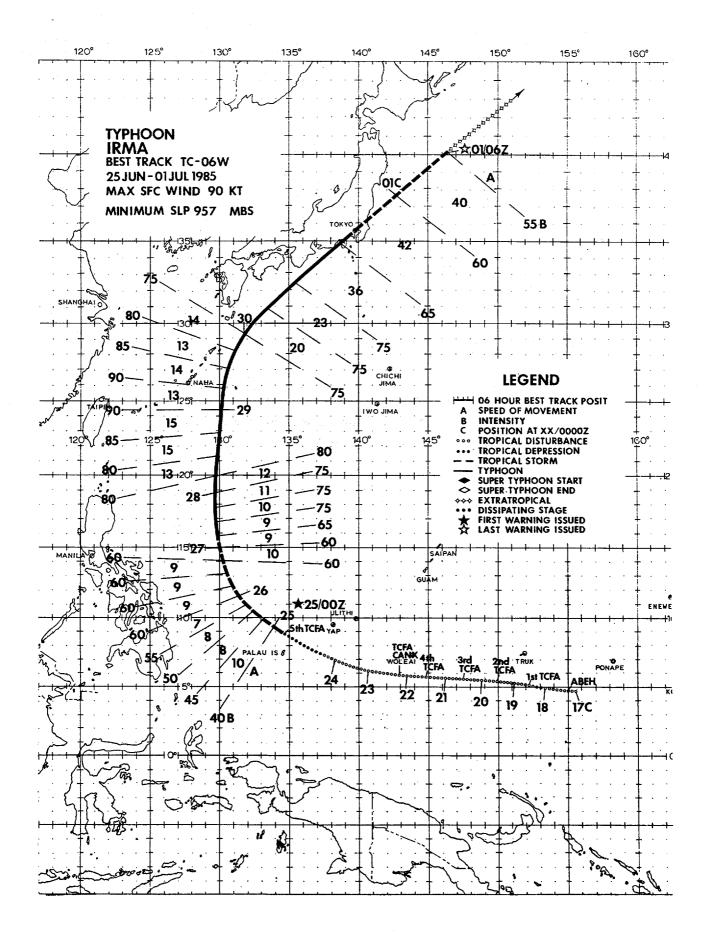


Figure 3-05-6. Plot of the OTCM (One-Way Interactive Tropical Cyclone Model) forecast guidance at 12-hourly intervals starting when the first warning was issued.



Although Typhoon Irma was not one of the more intense systems of the year, it became noteworthy due to the magnitude of property damage and loss of life it caused in the Philippines; and later, by passing directly over the Tokyo metropolitan area. It was the third significant tropical cyclone to develop in June within the monsoon trough and the first (in June) to recurve into the mid-latitude westerlies.

Typhoon Irma originated in the eastern extension of the monsoon trough in mid-June. It was slow to develop, taking eight days to become a tropical storm. At 0000Z on the 17th, the disturbance which later developed into Irma was located approximately 220 nm (407 km) southwest of Ponape (WMO 91348). Synoptic data showed a broad weak surface circulation with winds of 5 to 10 kt (3 to 5 m/s). Another disturbance, which would shortly develop into Typhoon Hal, was located to the northwest in the same trough 270 nm (500 km) east-southeast of Yap (WMO 91413). A broad surface ridge north of both disturbances dominated the northwest Pacific.

When the disturbance was initially mentioned on the 170600Z Significant Tropical Cyclone Advisory (ABEH PGTW), satellite imagery indicated that an upper-level cold low in the tropical upper-tropospheric trough (TUTT) was present northeast of Guam. This upper-level low, which was positioned 7 to 10 degrees of latitude north-northwest of Irma, was contributing to the upper-level diffluence and enhancing the convective activity in the vicinity of the disturbance. The potential for significant tropical cyclone development was evaluated as "fair" (meaning that issuing a TCFA during the advisory period was likely). By 0900Z on the 18th, the disturbance had moved west-northwest and was 150 nm (278 km) south-southeast of Truk (WMO 91334). Satellite imagery indicated the amount of convection was increasing and had more organization. Consequently, a TCFA on the system was issued at 181200Z and aircraft reconnaissance requested for the following day.

Over the next three days satellite imagery showed vigorous, but poorly organized, convection. The aircraft reconnaissance flight on the 19th of June at the 1500 ft (457 m) level was unable to locate a circulation center and reported a MSLP of 1006 mb. On the following day, aircraft reconnaissance found a surface circulation with a 5 nm (9 km) diameter area of light and varible surface winds, a drop in the MSLP of 4 millibars from the previous day and surface winds of 10 to 20 kt (5 to 10 m/s). The flow aloft over the disturbance was hampered by in-

creased outflow from Hal to the west. During this period TCFAs were re-issued at 1200Z on the 19th through the 21st of June. Early on the 22nd, the convection within the disturbance became so suppressed that the TCFA was cancelled at 220500Z.

Unfavorable vertical shear from Hal hindered development of the disturbance until the 24th. The 241200Z synoptic data showed increasing southwesterly low-level flow entering the disturbance. This coincided with Typhoon Hal making landfall over southern China. Subsequent satellite imagery at 241600Z revealed a significant increase in the size of the central cloud mass. The fifth, and final, TCFA on this system followed at 241730Z.

With Hal weakening overland in mainland China, Irma now began to intensify in earnest. The first warning on the system was issued at 250143Z, after the Dvorak intensity analysis of the 250000Z satellite imagery showed the disturbance had increased to tropical storm intensity. Aircraft reconnaissance later in the day (250516Z) located a 994 mb circulation center with 45 kt (23 m/s) maximum surface winds 90 nm (167 km) east-northeast of the center.

The initial forecasts called for Irma to follow in Hal's footsteps up the monsoon trough into the South China Sea and around the subtropical ridge. Due to the uncertainty about the analysis over the data sparse Philippine Sea, 400 mb synoptic track aircraft missions were flown on 25 and 26 June to help define the mid-level flow to the north of Irma. These flights confirmed the presence of lower 400 mb heights in the ridge along 130E, which indicated the ridge would not steer Irma into the South China Seas as it had done with Hal. JTWC now forecast a more northward movement with eventual recurvature to the northeast. This forecast scenario proved correct.

Irma slowed slightly as it approached the end of the ridge at 130E longitude and continued to intensify. Early on the 27th, Irma attained typhoon intensity as verified by synoptic ship observations of 65 kt (33 m/s) north-northeast of the center and the Dvorak intensity analysis. For the next two days (Figure 3-06-1) Irma moved northward and reached a maximum intensity of 90 kt (46 m/s) with a MSLP of 957 mb at 290000Z.

Along with reaching maximum intensity, Irma also came under the influence of the mid-latitude westerlies. Within 24-hours, Irma was accelerating rapidly to the northeast headed for Tokyo and the

Kanto Plain area of Japan's Honshu Island. Simultaneously, the system began weakening and undergoing extratropical transition. Aircraft reconnaissance on the 30th indicated entrainment of the cooler, drier air into the system. The Aerial Reconnaissance Weather Officer (ARWO), at 3008172, reported a 30 nm (56 km) elliptical eye with a slight tilt to the north-northeast.

By 010600Z, Irma had completed extratropical transition and the last warning was issued. The remains of Irma continued to move northeast toward the Kuril Islands where it merged with a complex low pressure area just south of the Kamchatka Peninsula.

In summary, as the Typhoon passed east of the Philippines on 28 and 29 June, heavy rains associated

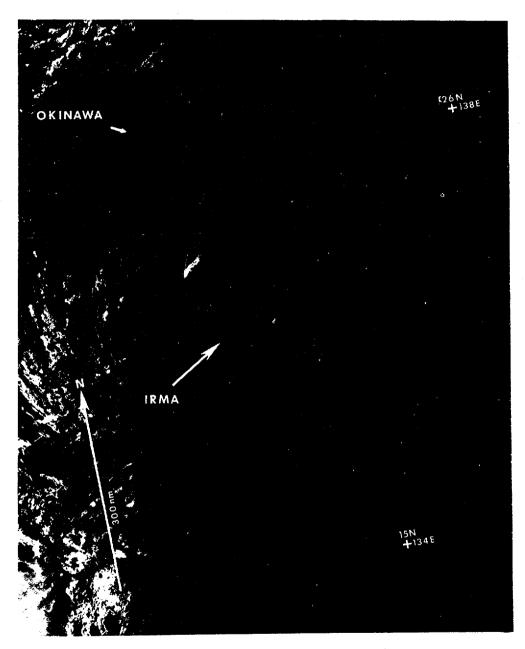


Figure 3-06-1. Irma, with maximum winds of 80 kt (41 m/s), nearing peak intensity south of Okinawa, Japan. (With the sun low in the west the cloud top topography is striking) (2809312 June DMSP visual imagery).

with the strong south westerly monsoon flow from the South China Sea across the island of Luzon produced more than 28 inches (711 mm) of rain. Flooding was widespread across areas of Manila and other sections of Luzon. At least 46 people perished in these floods; additionally, over 1,500 lost their homes. Later, when Irma made landfall on the southeasterm tip of Honshu at 301800z, maximum winds were estimated at 65 kt (33 m/s). The Naval Oceanography Command Facility at Yokosuka reported maximum winds

of 51 kt (26 m/s) with a peak gust to 83 kt (43 m/s). The associated barograph trace is shown in Figure 3-06-2. Various military activities at Yokosuka reported minor damage and flooding, but no significant personal injuries. However, Japan police reported three deaths and five people were missing as a result of Irma. Twelve bridges were reported out, flood damage occurred to over 20,000 homes and power outages affected about 440,000 households.

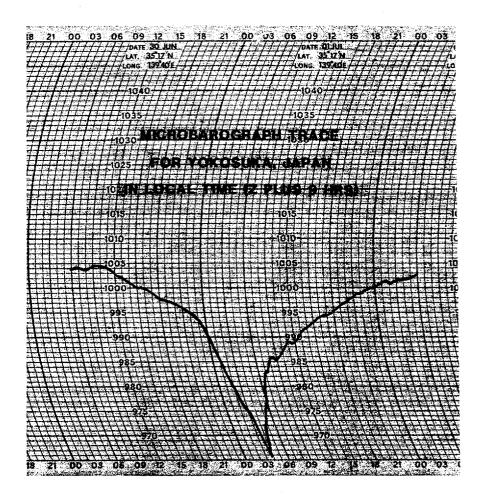
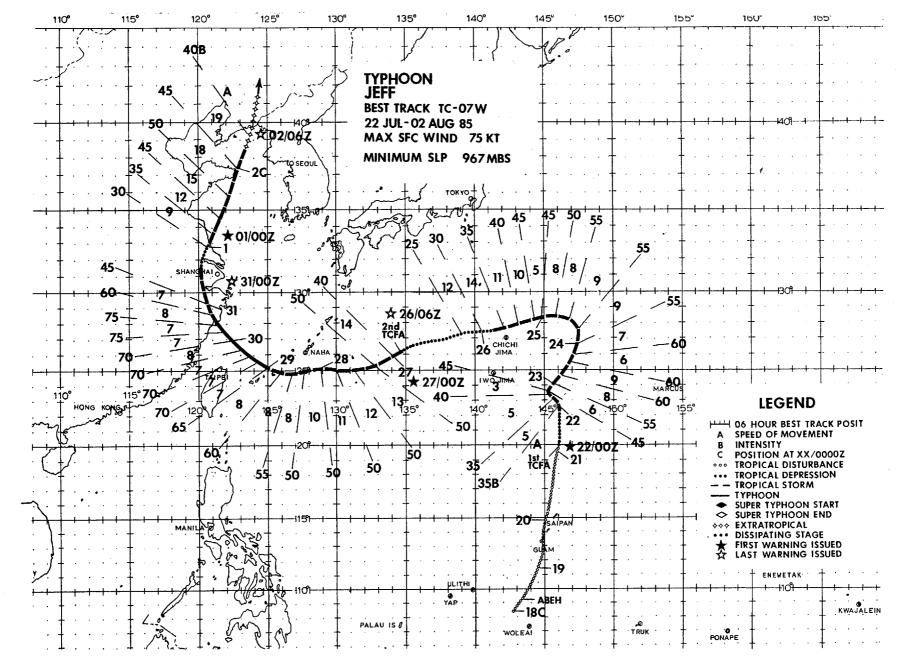


Figure 3-06-2. Barograph trace from the Naval Oceanography Command Facility in Yokosuka documenting Irma's passage over the Kanto Plain. The minimum sea-level pressure recorded was 963.3 mb at 3019302.



Typhoon Jeff was the longest-lived tropical cyclone of the 1985 season. It required a total of forty-one warnings and was finalled by JTWC on three separate occasions. During its twelve day life span, Jeff peaked in intensity three times: once east of the island of Iwo Jima; once west of Okinawa, Japan; and the third time over the Yellow Sea. Jeff, as it turned out, would be the only tropical cyclone to develop during July, a month that normally produces five cyclones.

After Typhoon Irma became extratropical on 1 July, tropical activity in the western North Pacific decreased. One significant tropical disturbance developed east of the Philippines on 4 July and moved into the South China Sea on the 6th before dissipating east of Hong Kong (WMO 45005) on 8 July. This disturbance was the subject of a TCFA from the 4th through the 7th. After this disturbance dissipated, the tropics stayed inactive until Typhoon Jeff develloped a week later.

The low-level circulation which was to mature into Typhoon Jeff, was spawned in the monsoon trough south of Guam on 18 July in a broad area of disorganized cloudiness that stretched along ten degrees north latitude. Consolidating slowly, the system drifted northward across the island of Guam and through the northern Marianas, bringing little more than increased rainshower activity. Three days after genesis, the development of persistent central convection and better cloud organization prompted a TCFA, valid at 210200Z. Aircraft reconinto the disturbance a few hours later was unable to locate a surface circulation, but instead found a broad trough with 10 to 15 kt (5 to 8 m/s) surface winds and a MSLP of 1006 mb. Early the next morning, a second aircraft reconnaissance mission found a tropical depression with a 1002 mb central pressure. As a result, the first warning was issued at 220000Z. For the next two days Jeff continued to intensify, reaching a peak of 60 kt (31 m/s) on the 23rd.

Up to this point, the steering flow had remained weak. Initially, Jeff's movement had been to the northwest, but then changed to the northeast in response to the approach of a mid-latitude trough from the northwest. Forecasting recurvature into the mid-latitude westerlies ahead of the trough was the most attractive possibility, especially since the tropical cyclone was already at 25N latitude and had been steadily tracking northeastward for nearly 24-hours. In contrast to the persistent northeasterly movement, both numerical forecast aids (NTCM and OTCM) consistently indicated a northwesterly track. Because of the major difference between what was actually happening and the guidance provided by the aids, the possibility of a return to a westerly or northwesterly track was still considered. The "less" likely alternative forecast scenario, i.e. northwestward movement, was repeatedly mentioned in the Prognostic Reasoning Messages (WDPAl PGTW), but the official forecast was for recurvature. Unfortunately, the "more" likely recurvature scenario to the northeast did not last long.

Late on the 23rd as the trough approached, vertical wind shear from the west increased over the system. It soon became apparent that Jeff was weakening and the persistent central convection was shearing away to the east (Figure 3-07-1). The midlatitude trough passed to the east on the 24th, leaving behind Jeff's exposed low-level circulation.

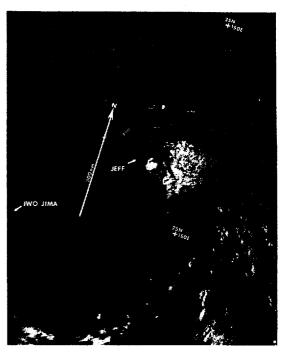


Figure 3-07-1. The low-level center of Tropical Storm Jeff located near the western edge of the central dense overcast. Strong upper-level westerly winds are shearing away the central convection to the east and will soon expose the low-level circulation center (2403187 July NOAA visual imagery).

The residual low-level vortex then began to move westward, embedded in the southeastern portion of the low- to mid-level anticyclone which was centered over northern Honshu. Without any regeneration of the central convection on the 25th or the 26th, Jeff

continued to weaken. By 260600Z the maximum surface winds had dropped below 30 kt (15 m/s). Despite the fact that a well-defined low-level circulation was still present, the lack of persistent central convection and the systems rapid movement to the westsouthwest made further development seem unlikely (Figure 3-07-2). As a consequence, the final warning was issued at 260600Z, with the caveat that "the system will be closely monitored for indications of possible regeneration." That was precisely what happened! Almost immediately after Jeff was finalled, convection began to redevelop about the low-level center since the shearing influence of the trough was absent.

Throughout the night of the 26th Jeff regenerated, and JTWC immediately alerted Kadena AB (WMO 47931) and other customers on Okinawa of the change. Weather satellite reconnaissance revealed a dramatic increase in central convection when warnings were again issued on Jeff, as a 35 kt (18 m/s) Tropical Storm, at 270000Z (Figure 3-07-3). Because Jeff was less than 24-hours from affecting Okinawa, Kadena AB went to Condition of Readiness III as a precaution. As Jeff neared Okinawa it slowed, passing about 75 nm south of Okinawa at 280530Z. The warnings verified well. Maximum sustained winds at Kadena AB were 25 kt (13 m/s), with a peak gust to

OKINAWA

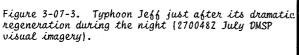
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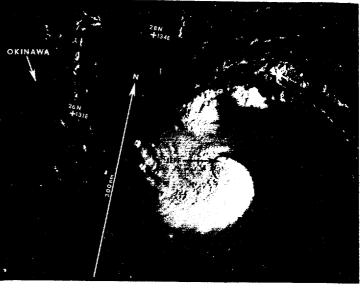
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39 kt (20 m/s) at 280208Z. Naha (WMO 47930) had a peak gust of 47 kt (24 m/s) at 280355Z. Eighteen hours after passing south of Okinawa, Jeff attained typhoon intensity. By that time, the Typhoon had turned to the west-northwest as it started to move around the western side of the subtropical ridge. Further intensification to a peak of 75 kt (39 m/s) occurred as Typhoon Jeff approached, and made landfall on, the coast of mainland China approximately 180 nm (333 km) south of Shanghai (WMO 58367) (Figure 3-07-4). Once onshore, surface frictional effects caused a rapid decrease in maximum winds. The persistent central convection began to fall apart and, once again, the system was finalled, although "movement back off the coast and regeneration in the Yellow Sea" remained a distinct possibility (Figure

Indeed, Jeff was not finished yet. Warning number 36 was issued at 0000z on 1 August as meteorological satellite reconnaissance reported significantly increased convection over water. The track was now to the north-northeast around the western edge of the subtropical ridge. Acceleration was gradual as Jeff redeveloped maximum surface winds of 50 kt (26 m/s) by 1800z on 1 August. Strong southwesterly winds aloft hindered the system's attempt to further intensify and achieve vertical alignment

Figure 3-07-2. The nearly convection free low-level circulation of Jeff as it was finalled for the first time [260508Z July NOAA visual imagery).





between the low-level cyclone and anticyclone aloft. Then, at 0600Z on 2 August Jeff was finalled for the third and last time after completing extratropical transition in the northern Yellow Sea.

In retrospect, eastern China bore the brunt of Typhoon Jeff. The provinces of Shanghai and coastal Zhejiang were battered. News reports indi-

cated at least 180 people were killed, 1400 injured and tens of thousands left homeless. In addition, 1400 watercraft, mostly fishing boats, were lost or badly damaged. Some 75,000 acres (30,352 hectares) of crops were destroyed and another 400,000 acres (161,878 hectares) badly damaged, by the typhoon. China's irrigation network was severly disrupted by flooding.

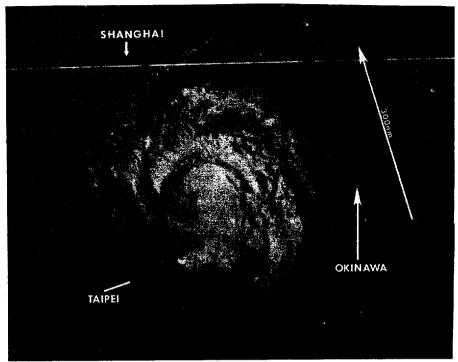


Figure 3-07-4. Typhoon Jeff near maximum intensity less than 18-hours from making landfall over eastern mainland China. During the hours immediately proceeding landfall, a small banding eye formed (292303Z July NOAA visual imagery).

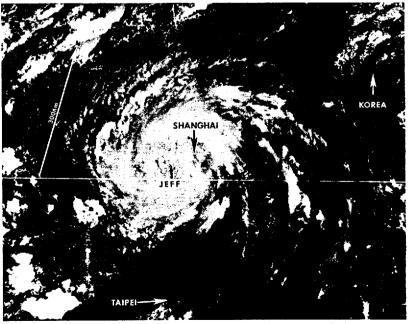
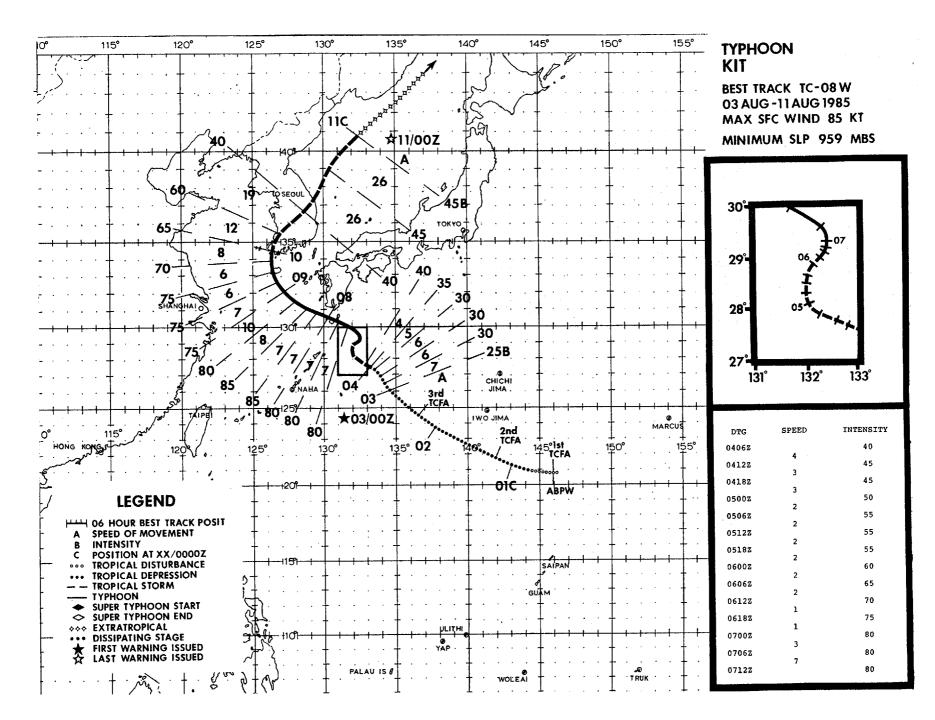


Figure 3-07-5. Jeff over mainland China after being finalled for the second time. Jeff spent nearly 36 hours over mainland China before moving back over open water and reintensifying (310556Z July NOAA visual imagery).



Typhoon Kit was the first of seven tropical cyclones to reach warning status during August 1985. As was the case with its predecessor, Typhoon Jeff, Kit's recurvature posed considerable forecast problems. Like many WESTPAC tropical cyclones, Kit developed from an area of increased convection in the eastern portion of the monsoon trough.

As the remnants of Typhoon Jeff transited eastern China, satellite imagery early on 31 July showed that a possible circulation with good convective organization was rapidly forming north of Guam. This area of disturbed weather was developing at the northeast end of the monsoon trough, which at the time was linked to the trailing end of an old frontal boundary. The presence of this frontal boundary may have provided some initial low-level cyclonic shear to account for the system's rapid formation. Synoptic data indicated that a low-level circulation was present in the disturbed area with winds of 10 to 20 kt (5 to 10 m/s) and a MSLP of 1004 mb. The disturbance was mentioned on the Significant Tropical Advisory (ABEH PGTW) at 310451Z, but development was so rapid and the satellite signature so impressive, that a TCFA was issued by 310600Z. No significant additional development occurred overnight, however, as the system moved to the west-northwest. The first aircraft reconnaissance mission into the disturbance the following day found winds of only 20 kt (10 m/s) on the west side of a 1004 mb surface trough. The TCFA was reissued on the 1st as development still appeared likely. Follow-on aircraft reconnaissance was requested for the 2nd. This time the investigative mission located a 30 nm (56 km) wide surface circulation center with better organized winds of 10 to 20 kt (5 to 10 m/s) and a MSLP of 1005 mb, one millibar higher than on the previous day. A third TCFA followed at 020600Z as the disturbance tracked to the northwest. Aircraft reconnaissance was again requested.

The next aircraft reconnaissance mission flew into the system late on the 2nd, closed a circulation at 0222042 and reported that the MSLP had decreased to 1000 mb. Both aircraft and synoptic data now indicated 25 kt (13 m/s) surface winds near the center. JTWC responded by issuing the first warning on Tropical Depression 08W valid at 030000Z. During the next 24-hours the tropical depression slowly intensified while moving to the northwest along the southern periphery of a high pressure ridge located over Japan.

Tropical Depression 08W was upgraded to Tropical Storm Kit at 040000Z after aircraft reconnaissance reported 35 kt (18 m/s) winds in all quadrants. Once upgraded. Kit continued to intensify and move slowly west-northwestward for the next 24 hours. Extended forecasts, based on FNOC's NOGAPS prognoses, indicated that Kit would move northwestward around the ridge which was expected to be displaced southeastward in advance of an approaching trough. This would result in Kit recurving to the northeast after 36 hours and eventually make landfall on Japan (Figure 3-08-1). However, the trough was weaker than fore-cast so instead of eroding the ridge and allowing Kit to recurve into the westerlies, the trough only temporarily weakened the ridge as it passed to the north. Kit responded to the trough passage by slowing and turning to the north on the 5th. Kit then moved slowly northward through the 6th and into the 7th while continuing to intensify. By the 7th the trough had passed to the east and the trooical cyclone was left in the weakness between the subtropical ridge to the east and a weaker anticyclone over mainland China. With the passage of the mid-latitude trough over the subtropical ridge, the ridge began to build westward on the 7th. Kit responded by resuming a course to the west-northwest and intensifying (Figure 3-08-2). Kit attained its maximum intensity of 85 kt (44 m/s) at 080600Z southwest of Kyushu as it moved into the East China Sea. With FNOC's NOGAPS progs indicating another mid-latitude trough approaching from the west, and Kit definitely nearing the western end of the subtropical ridge axis, recurvature over South Korea. with extratropical transition in the Sea of Japan, appeared likely. After 081200Z, Kit began to weaken as relatively cooler and drier low-level air was entrained into the vortex's southwest quadrant.

Kit recurved south of the Korean peninsula and was barely at typhoon strength when landfall occurred on the southwest tip of South Korea early on the 10th. Kit still packed quite a punch, however. Torrential rains on the island of Cheju and southern coastal Korea caused extensive property and crop damage. At least ten people were reported missing or killed. Additionally a Department of Defense communications site in the area received an estimated 1.5 million dollars damage. With extratropical transition in progress, Kit rapidly lost strength while accelerating northeastward into the Sea of Japan. Extratropical transition was completed and JTWC issued the final warning on Kit at 110000Z. Subsequent warnings on the extratropical remnants of Kit were contained in the NAVOCEANCOMCEN GUAM Northwest Pacific Extratopical Wind Warning bulle-

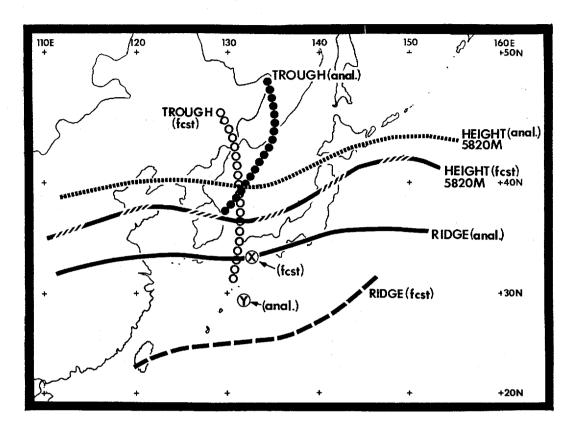


Figure 3-08-1. Comparison of 500mb 48-hour prognosis with verifying 500mb analysis. This chart depicts the major 500mb features available from the 48-hour prognosis valid 0600007 August: ridge axis (dashed line), trough line (open dots), 5280 meter height isopleth (), and forecast warning point (X). The verifying 500mb analysis is shown for 0600007 August: ridge axis (solid line), trough line (solid dots), 5280 meter height isopleth (), and Best Track position (Y) for Kit. In retrospect, with the 48- hour prognosis and the location of the forecast warning position (X) - north of the ridge (forecast) and east of the trough (forecast) - a recurvature scenario looks valid. The tropical cyclone is an immediate threat to Japan. However, with the verifying analysis, Kit's position (Y) remains south of the ridge (analysis) and the trough (analysis). This is not favorable for recurvature. This pattern suggests weakened steering flow, with slow and erratic tropical cyclone movement - which is what occurred on the 6th.

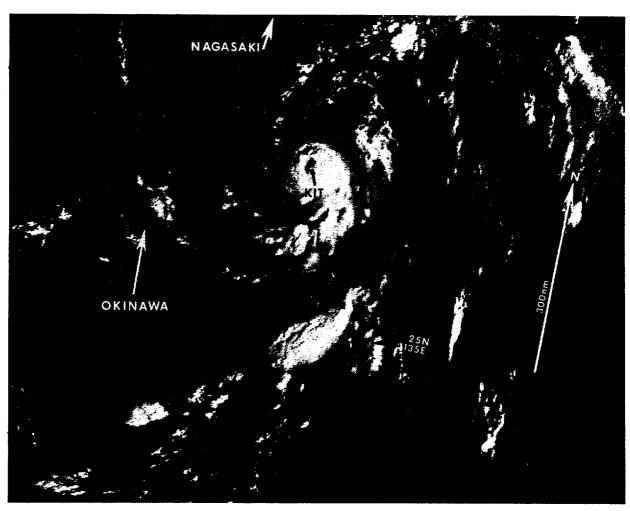
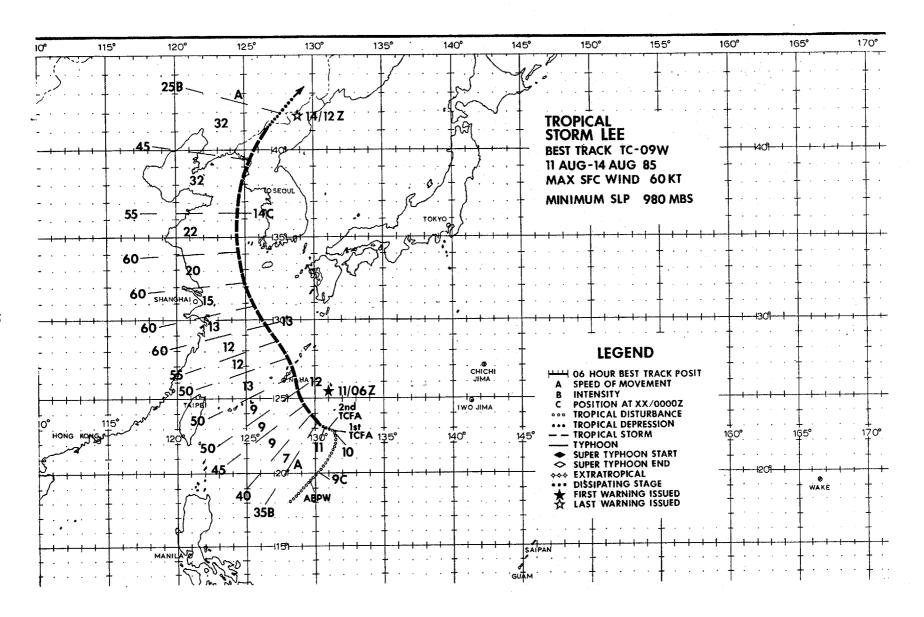


Figure 3-08-2. Typhoon Kit near maximum intensity south of the island of Kyushu, Japan. Kit remained a very compact storm for much of its lifetime, with the over-30 kt (15 m/s) and over-50 kt (26 m/s) wind radii remaining smaller than normal (0700282 August DMSP visual imagery).



Unlike its predecessors, Typhoons Irma, Jeff, and Kit, that developed on the northeast periphery of the southwest monsoon trough, Lee formed in the trough in the central Philippine Sea. Lee's initial development and movement within the monsoon trough was influenced by Typhoon Kit, which was located further to the north.

On the 31st of July, the monsoon trough was oriented southwest to northeast, extending from the central Philippine Sea eastward across the northern Mariana Islands. To set the stage, Typhoon Kit, which developed on the northeastern end of the trough, moved northwestward and intensified. As Kit's low pressure area migrated northwestward, the axis of the monsoon trough repositioned along with it until finally, on the 8th of August the monsoon trough was oriented almost north to south.

Ship reports at 081200Z indicated a broad circulation in the trough 480 nm (889 km) south of the island of Okinawa with a minimum sea-level pressure (MSI.P) of 1002 mb. Satellite imagery also showed that the convection associated with this

disturbance had some curvature. Since good outflow channels were present aloft to the south and south-west, the Significant Tropical Weather Advisory (ABPW PGTW) was reissued at 082000Z to include this system.

During the following 24-hours, as the disturbance moved to the north-northeast, the convection remained on the equatorward side of the circulation center, associated with the 15-25 kt (8-13 m/s) convergent low-level wind flow. Synoptic data showed only 5 kt (3 m/s) winds on the northwest side of the circulation. This area of lighter winds underwent a change on the 10th of August. The low-level subtropical ridge built back to the north of the disturbance and across the Rhukyu Islands in the wake of Kit and the pressure gradient increased over the north side of the disturbance. In response, the broad low-level circulation consolidated with increased winds of 10-15 kt (5-8 m/s) over the northwest quadrant (Figure 3-09-1). Simultaneously, the upper-level wind reports showed an anticyclonic circulation was developing over an area of commashaped convection. The cloudiness increased in

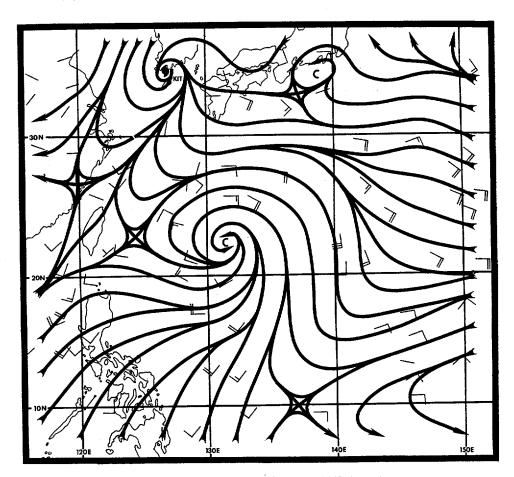


Figure 3-09-1. Surface analysis at 1000002 August showing the subtropical ridge which built across to the north of the disturbance in the wake of typhoon Kit. The monsoon depression is beginning to consolidate. The convergent flow is only on the south and east sides of the broad circulation center.

amount and was near the surface center. These events prompted the issuance of the first TCFA at 1002302.

The initial aircraft reconnaissance mission, at 100650Z, into the disturbance reported a broad surface circulation with dimensions of 60 nm (111 km) north to south by 90 nm (167 km) east to west and a 997 mb MSLP. The new location of the circulation center, as determined by the aircraft, required the issuance of a second TCFA at 100800Z. The circulation center was relocated 115 nm (213 km) further to

the east-southeast and outside of the original TCFA area which was based on an earlier position derived from visual satellite data.

During the following twenty-four hours, Lee turned towards the northwest, moved very slowly, and showed little intensification. This slow intensification could be related to the persistent strong flow aloft from the north over the disturbance (Figure 3-09-2). Satellite imagery for the same period is shown in Figure 3-09-3).

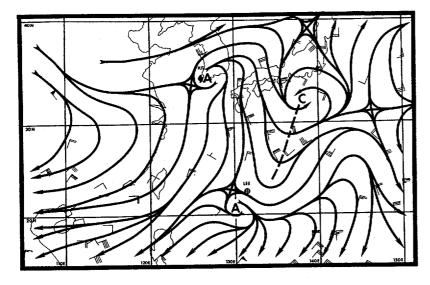
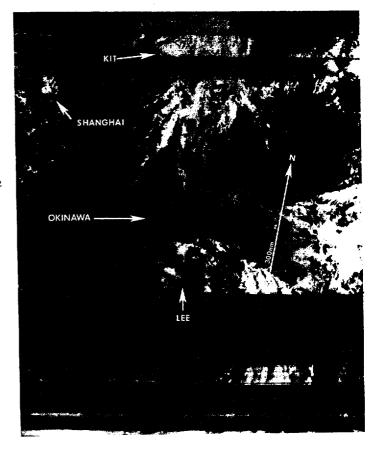


Figure 3-09-2. The 100000Z August 200 mb analysis showing the northerly flow aloft across the disturbance.

Figure 3-09-3. With the northerly flow aloft there is little convection on the poleward side of the disturbance's circulation center. The cloudiness persists over the low-level southwesterly flow [1001082 August DMSP visual imagery].



An aircraft reconnaissance flight into the disturbance at 110656Z found a 25 nm (46 km) diameter light and variable wind center with only 15 kt (8 m/s) maximum surface winds around it. However, the MSLP had dropped another 5 mb during the previous twenty-four hours to 992 mb. This supported maximum winds of 40-45 kt (21-23 m/s) based on the Atkinson/Holliday wind/pressure relationship. Aircraft, synoptic and satellite data indicated that stronger winds of 25-35 kt (15-18 m/s) were located in a band displaced 60-180 nm (111-333 km) to the east of the center. These data led to the issuance of the first warning at 110600Z. As a result, Kadena AB, Japan (WMO 47931) immediately set a Condition of Readiness III.

Fortunately, Lee continued to exhibit typical characteristics of a monsoon depression where the maximum surface winds and intense convection never consolidate at the surface center. Instead, the maximum surface winds remained in the eastern semicircle. As a consequence, when Lee passed within 15 nm (28 km) northeast of Okinawa at 120430Z, the maximum sustained winds stayed well to the east of the island. In fact, the strongest winds experienced at Kadena AB were from the west-southwest at 22 kt (11 m/s) with 32 kt (16m/s) approximately twelve hours later. Naha (WMO 47936) located on an elevated and exposed part of the island of Okinawa reported highest winds (in association with the southwest

monsoon flow) of 27 kt (14 m/s) with gusts to 40 kt (21 m/s) at 121948Z. At that time Lee was 170 nm (315 km) to the north-northwest of the station. Overall, Lee's track and asymmetrical wind distribution spared Okinawa, but the western coast of South Korea appeared to be the next target and preparations had begun for the tropical cyclone's approach.

On the synoptic scale, lower standard pressurelevel heights prevailed over the East China Sea between the two ridges. As the mid-latitude trough (Figure 3-09-4) approached the Yellow Sea on the 13th of August, it came into phase with the short wave trough extending south-southwestward from a deepening Siberian low near 52N 116E. By 131200Z the trough was oriented along 118E longitude and the ridge over Japan continued to build northward across the Seas of Japan and Okhotsk. This caused the mid-level steering flow from the south to increase over Lee. In response, Lee steadily accelerated across the East China Sea and passed 240 nm (444 km) west of the island of Kyushu, Japan. Coastal stations on Kyushu reported 10-25 kt (5-13 m/s) sustained winds. Aircraft reconnaissance reported the band of 40-60 kt (21-31 m/s) maximum winds remained about 120 mm (222 km) west of the coast.

As Lee began to break free of the monsoon trough, it reached it's peak intensity of 60 kt

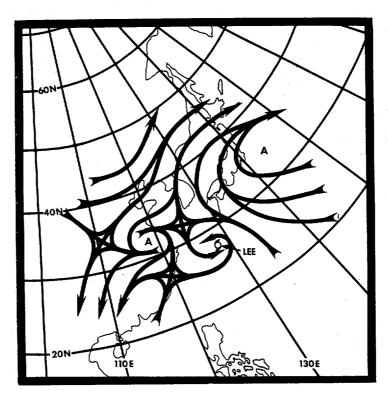


Figure 3-09-4. The 121200Z August 500 mb analysis with troughing in the subtropical ridge over the East China Sea.

(31 m/s) (Figure 3-09-5). Satellite imagery showed orientation of the supporting convection was changing, too. The strong upper-level westerlies were already pushing Lee's outflow to the northeast towards the southwest coast of South Korea.

Lee continued to accelerate and followed a northerly track across the Yellow Sea on 14 August, staying approximately 120 nm (222 km) offshore. This spared the coastline from any significant damage. A few reports of 35 kt (18 m/s) sustained winds were recorded at the southwest portion of the Korean peninsula. Later, Lee transited the North Korean coastline 60 nm (111 km) southeast of Sinuiju (WMO 54498) at 140600Z, and dissipated rapidly inland over the mountainous terrain. No reports of damage were available.

Of note, the tracks of Jeff, Kit, Lee, and later, Mamie in the Yellow Sea came under the

influence of the same synoptic scale pattern during the first three weeks of August with ridging over Japan and troughing over northeast mainland China. This pattern maintained semi-persistent south-to-north mid-level steering flow over the Yellow Sea. Each tropical system in its own time recurved around the western periphery of the subtropical ridge and accelerated. Figures 3-09-6 and 3-09-7 show the approximate location and orientation of the synoptic scale trough with respect to the point of recurvature of each tropical system. The pattern shifted eastward from Jeff to Kit, then retrograded westward with Lee, and later, Mamie's track. The points of recurvature also indicate the western extent of the subtropical ridge in each case plus the northward displacement of the ridge axis which was well north of its climatological position.

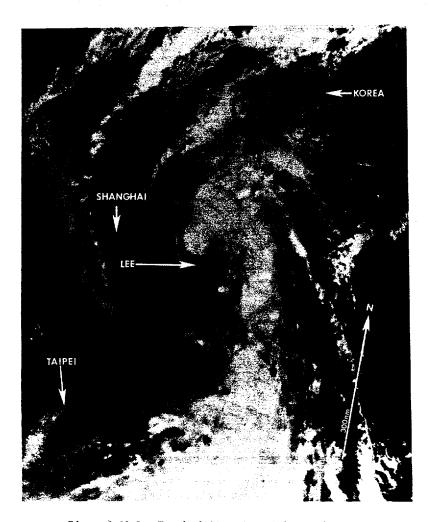


Figure 3-09-5. Tropical Storm Lee at its maximum intensity of 60 kt (31 m/s). The upper-level anticyclonic circulation displaced slightly to the northeast of the exposed low-level circulation center (130518Z August NOAA visual imagery).

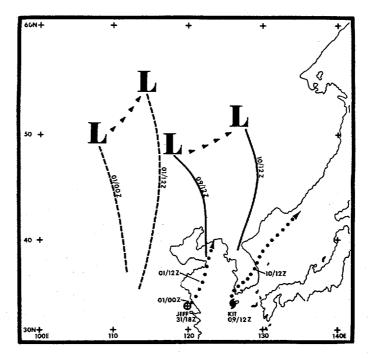


Figure 3-09-6. The best tracks (dotted line) of Jeff and Kit from the point of recurvature through the final warning are depicted. The times along the dotted lines at, or after, the recurvature point correspond with the respective positions of the mid-latitude troughs (dashed and solid lines). The arrows show the movement of the Siberian mid-level lows. Notice the Siberian low track is displaced further southeast during Kit.

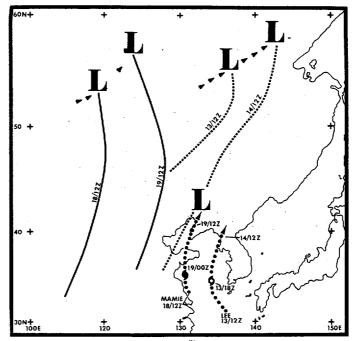
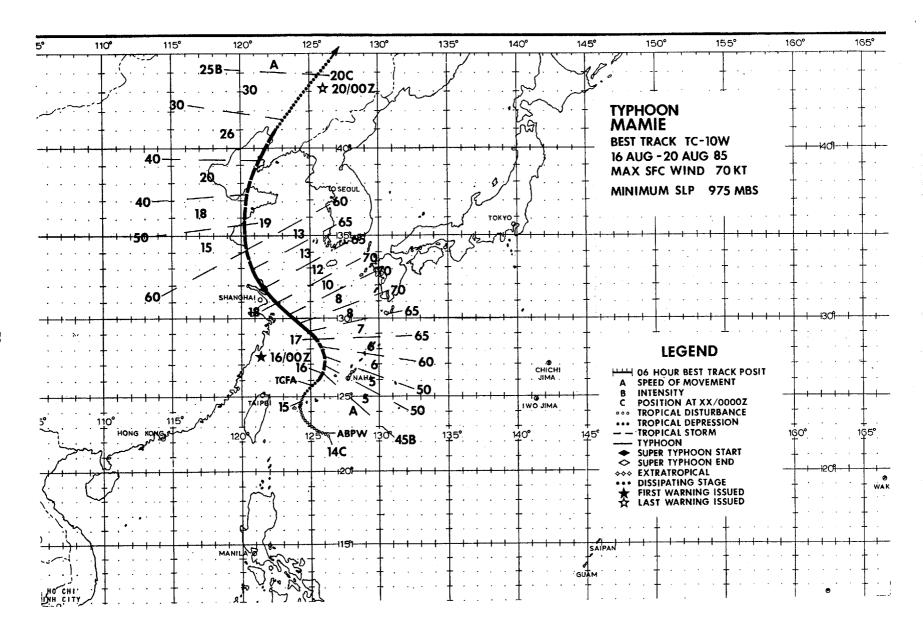


Figure 3-09-7. The best tracks (dotted line) of Lee and Mamie from the point of recurvature through the final warning are shown. The times along the dotted lines at, or after, the recurvature point correspond with the respective positions of the mid-latitude troughs (dashed and solid lines). Notice that the track of the Siberian lows retrogrades between the second and third week of August.



Despite reaching a maximum intensity of only 70 kt (36 m/s), Typhoon Mamie was one of the more destructive tropical cyclones of the 1985 western North Pacific season. Following a path similar to its predecessor, Tropical Storm Lee, Mamie was responsible for at least 35 deaths and caused heavy damage to crops, homes, and shipping. For two days, Mamie skirted a 400 nm (740 km) stretch of the eastern Chinese coast from Shanghai (WMO 58367) to the Shantung Peninsula, inundating farmland and washing away many dikes and dams with its torrential rains. More than 800,000 civilians and soldiers were mobilized to combat the flooding and repair damage. Estimates of the destruction caused by Mamie were staggering: over 6.5 million trees uprooted, 2.9 million metric tons of high stalk farm crops ruined, more than 120,000 houses destroyed or damaged, over 200 watercraft of various types sunk or driven aground, and over 122,000 domestic livestock drowned.

Mamie formed from an area of convection that was originally part of the southwest monsoon flow into Tropical Storm Lee. At 0129Z on 14 August, visual satellite imagery indicated slight curvature in an area of convection due east of Taiwan that had separated from Lee's inflow. Figure 3-10-1 shows this area and its relationship to Lee. Subsequently, the area was included as a "poor" on the 140600Z Significant Tropical Weather Advisory (ABPW PGTW). Satellite imagery through the remainder of the 14th showed the disturbance was turning to the north and becoming more organized as the separation from Lee's wind field increased. The 150600Z ABPW PGTW bulletin reflected this development by upgrading the potential for development to "fair" and aircraft reconnaissance of the disturbance was requested for the following morning.

At 151200Z, a TCFA was issued, based on increased curvature of the convective bands and anticyclonic cirrus outflow indicated by satellite imagery. At this point, the area was beginning to intensify more rapidly than before, due partly to Lee's waning influence on the new circulation. At 152340Z, aircraft reconnaissance closed-off a circulation of tropical storm intensity 90 nm (167 km) due west of Okinawa, prompting the issuance of the first warning on Mamie at 160000Z. Less than three hours later Kadena AB on Okinawa reported its strongest winds from Mamie - south at 20 kt (10 m/s) with a peak gust to 35 kt (18 m/s).

On 16 August Mamie began to turn to the northwest. This turn was due to the low-level ridge north of Mamie strengthening slightly as the mid-latitude trough that had interacted with the remnants of Tropical Storm Lee began to move rapidly to the east in the mid-latitude westerlies. However, the ridge never became strong enough to stop Mamie from heading north-northwest, then north through a weak area in the ridge that persisted throughout Mamie's lifetime. Mamie continued to intensify, reaching typhcon intensity at about 170000Z as it moved northwest at 7 kt (13 km/hr) toward Shanghai (WMO 58367).

The Typhoon reached a peak intensity of 70 kt (36 m/s) 12-hours later at 171200Z, just prior to affecting the Chinese coast near Shanghai (Figure 3-10-2). Mamie traversed the Chinese coastline, hitting Tsingtao, with decreased winds of 50 kt (26 m/s) at about 190200Z. Mamie then turned north around the western periphery of the subtropical ridge and crossed the Shantung Peninsula, striking Yantai, China (near Fushan WMO 54764) at about 190600Z.

Mamie accelerated to 20 kt (37 km/hr) and weakened to a 40 kt (21 m/s) tropical storm just prior to crossing the Yellow Sea and moving toward Dairen, China (WMO 54662). After making landfall just west of Dairen at 191200Z, Mamie began to dissipate over land. Because Mamie's intensity decreased to an estimated 25 kt (13 m/s) and due to its location over the mountains of northeast China, the last warning was issued at 200000Z.

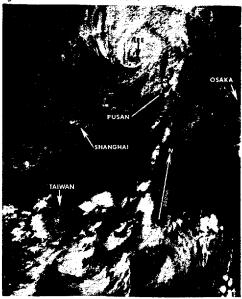


Figure 3-10-1. The tropical disturbance that became Typhoon Mamie is located east of the island of Taiwan. The slightly curved convective band and separation from the cloudiness associated with Tropical Storm Lee to the north were the first signs of organization (1401292 August DMSP visual imagery).

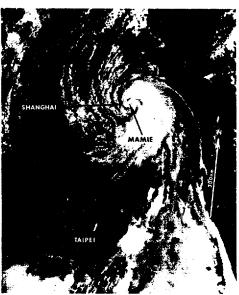
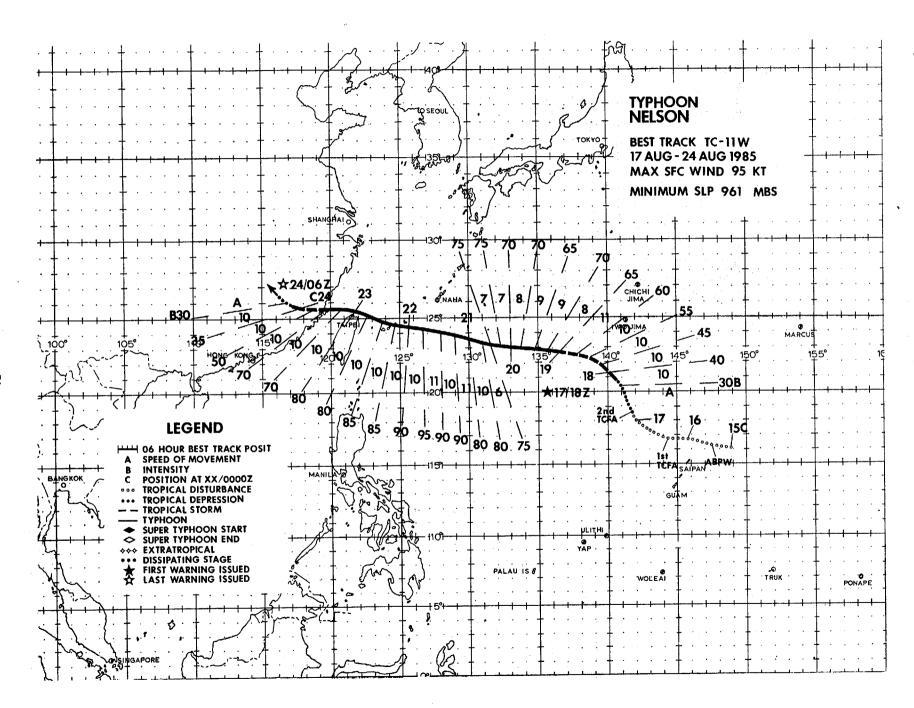


Figure 3-10-2. Mamie with typhoon force winds passing just east of Shanghai, China (1801492 August DMSP visual imagery).



Typhoon Nelson was the fourth of seven tropical cyclones that developed over the Northwest Pacific in August. It caused substantial damage and loss of life as it passed through the southern Ryukyu Islands, brushed by northern Taiwan and crossed into mainland China.

On 14 August Tropical Storm Lee was dissipating as it moved across North Korea and Typhoon Mamie was building near the southern Ryukyu Islands just east of Taiwan. The following day the disturbance that developed into Typhoon Nelson was first noticed as a small, but persistent, area of poorly organized convection 150 nm (278 km) east-northeast of the island of Saipan in the Marianas. The area was located in the near-equatorial trough where the convective cloudiness was enhanced by the divergent upper-level flow associated with an upper cold low in the tropical upper-tropospheric trough (TUTT). Synoptic data at 150000Z indicated that southwesterly gradientlevel flow from the Philippine Sea was near the disturbance. These factors, plus the satellite imagery at 150300Z which showed a slight cyclonic curvature in the convection, prompted mention of the area on the 150600Z Significant Tropical Weather Advisory (ABPW PGTW).

During the next 24-four hours, satellite imagery revealed a marked increase in the amount of convection over the northeastern portion of the disturbance with another larger area of unorganized convection moving toward the disturbance from the west-southwest. By 160000Z, synoptic data indicated that the soutwesterly gradient flow had propagated eastward to the disturbance and an associated upper-level anticyclone had formed over the disturbance. A Tropical Cyclone Formation Alert (TCFA) followed at 160625Z.

Aircraft reconnaissance late on the sixteenth was unable to locate a surface circulation. However, the aircraft reconnaissance weather officer

(ARMO) did report: a narrow low-level trough that was 200 nm (370 km) in extent and elongated northeast—southwest; three possible 1002 mb pressure centers; and maximum winds of 10-20 kt (5-10 m/s) to the north of the trough. The TCFA was reissued at 170555Z.

A dramatic increase in both the cyclonic curvature and amount of central convection occurred at 171600Z. The Dvorak intensity estimate of the system was 35 kt (18 m/s). This intensity estimate together with the continuing development of the system led to the first warning on Nelson at 171800Z. Aircraft reconnaissance at 172131Z confirmed this development, and more, when gale force surface winds were located north of a 989 mb low pressure center. Specifically, the flight revealed the 700 mb center was displaced 31 nm (57 km) to the northwest of the surface center and a band of 45 kt (23 m/s) low-level winds was located 90 nm (167 km) to the northmest.

Due to the uncertainty in the Fleet Numerical Oceanography Center (FNOC) mid-level wind fields in the data sparse region south of Japan, a 400 mb synoptic track mission was flown early on the 18th to better define the mid-level steering flow north of Nelson. Data from this flight confirmed that the ridge extended westward over Nelson and indicated forecasts for an "under the ridge" scenario were appropriate. This forecast scenario proved to be correct.

Further intensification occurred as Nelson assumed a more west-northwesterly track. At 1900002, Nelson was upgraded to a typhoon after aircraft reconnaissance indicated the system had a 5 nm (9 km) diameter light/variable wind center with a 979 mb MSLP and 65 kt (33 m/s) maximum surface winds displaced 40-120 nm (74-220 km) northwest of the center. Almost three days later, at 211800Z, Nelson reached a peak intensity of 95 kt (49 m/s) with a MSLP of 961 mb (see Figure 3-11-1).

Nelson passed between the Ryukyu Islands of Yaeyama and Miyako early on 22 August and continued moving west-northwestward under the ridge. Early on 23 August (Figure 3-11-2), the typhocn skirted northern Taiwan passing within 25 nm (46 km) of Taipei (WMO 58968). The tropical cyclone quickly transited the Formosa Straits and made landfall 40 nm (74 km) southwest of Fuchou (WMO 58847) in China's Fuchien province at 241400Z.

In retrospect Nelson's passage between Yaeyama and Miyako Islands resulted in more than 1.5 million dollars in damage to banana and sugar cane crops. As Nelson skirted northern Taiwan, four people were reported killed from the associated winds and tor-

rential rains. At landfall in China's Fuchien province, another forty-eight people perished, with an additional 329 reported injured, more than 5,000 homes destroyed, 969 fishing boats sunk and about 178,500 acres of crops lost.

After Nelson dissipated, an additional three days of heavy rains associated with the remains of the system affected many areas of eastern China. At least 147 people were killed and more than 30,000 persons were driven from their homes by flooding in Hunan province further inland. Later, Shanghai reported 50,000 homes with flood damage resulting from these heavy rains inland.

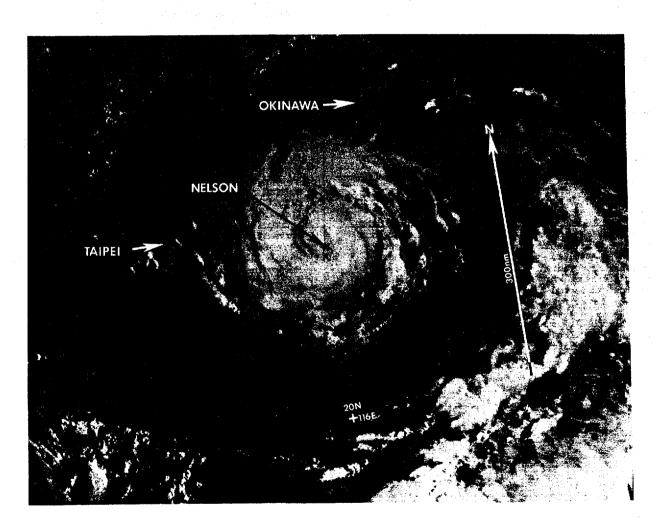


Figure 3-11-1. Typhoon Nelson near maximum intensity (2123552 August NOAA visual imagery).

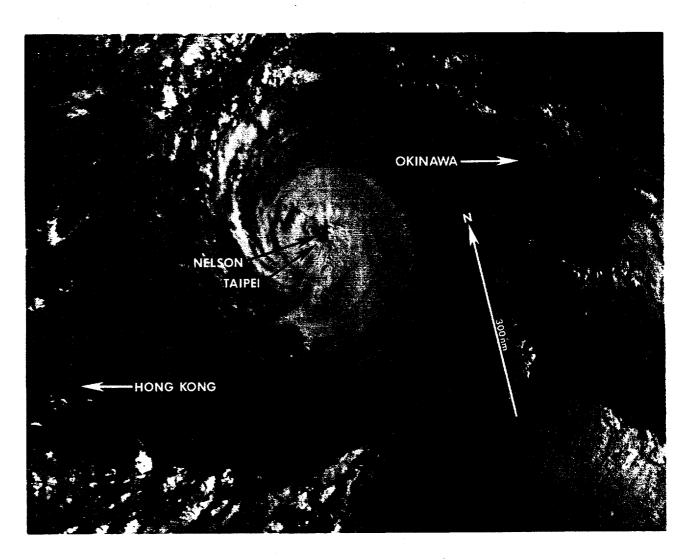
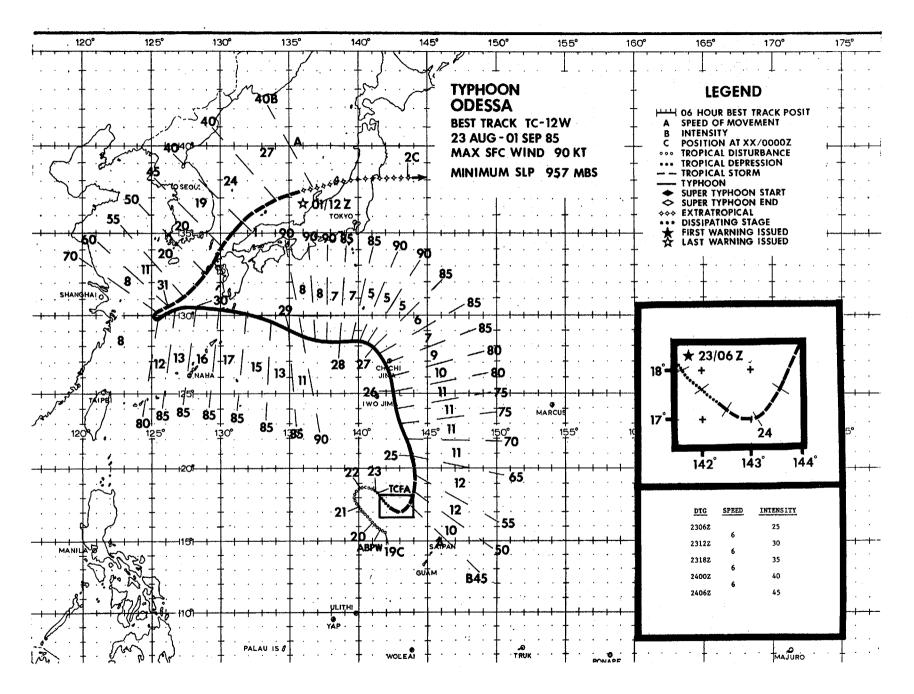


Figure 3-11-2. Nelson skirting the island of Taiwan (222334Z August NOAA visual imagery).





Odessa persisted for almost two weeks and required a total of thirty-eight warnings - in this regard, only Typhoon Jeff with forty-one exceeded Odessa's total during 1985 season. The system became part of a multiple tropical cyclone outbreak along with Typhoon Pat and Tropical Storm Ruby. At one time five tropical cyclones were in warning status. Ultimately, Odessa underwent a complex binary interaction with Typhoon Pat south of Japan before completing extratropical transition over the Sea of Japan.

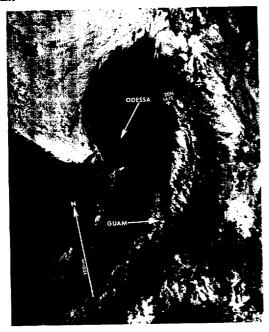


Figure 3-12-1. Nighttime imagery of Odessa with a single outflow channel that is directed equatorward (241227Z August DMSP infrared imagery).

By the third week of August, Typhocn Nelson had moved westward across the northern Philippine Sea. At that time, the eastern end of the monson trough extended across the Philippine Sea to the vicinity of Guam. The eastern end of the low latitude westerly monsonal flow, where it interacted with the easterly tradewinds, became the preferred location for maximum cloudiness. Initially, on 19 August, the deep convection in this area appeared random with little, or no, curvature, but its persistence was sufficient reason for its inclusion on the Significant Tropical Weather Advisory (ABPW PGTW). With maximum surface winds in the monsocnal flow of 15 to 20 kt (8 to 10 m/s) and a minimum surface pressure of 1006 mb, the potential for development was rated as poor.

This potential for intensification changed to fair at 220600Z as the convective mass began to increase in size over a low-level circulation which began to separate from the surrounding cloudiness. A TCFA followed at 230230Z based on meteorological satellite imagery which showed a Central Dense Overcast (CDO). Aircraft reconnaissance was scheduled for the next day. The persistent CDO, a favorable outflow channel aloft to the south, and a pre-existing low-level circulation center, prompted the first warning for Tropical Depression 12W a short time later at 230600Z. The Depression was upgraded at 240000Z when aircraft reconnaissance observed sustained surface winds of 30 kt (15 m/s) that were gusting to 55 kt (28 m/s) southeast of the center the MSLP was estimated to be 1000 mb (Post analyses revealed that Odessa reached tropical storm intensity shortly before 231800Z). The aircraft also discovered that the low-level center had drifted southeastward during the night, when interpretation of infrared satellite imagery was restricted to positioning the poorly defined upper-level circulation center.

Erratic movement became less of a concern as Odessa matured and assumed a north-northwestly track. Aircraft reconnaissance at 242340Z reported typhoon

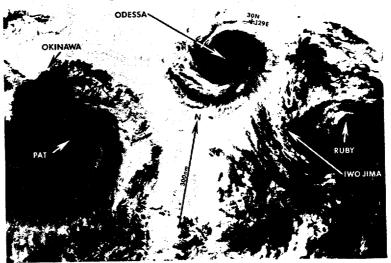


Figure 3-12-2. Odessa with channel-less or nochannel outflow (281024Z August NOAA infrared imagery).

intensity winds and a circular eye 15 nm (28 km) in diameter. The warning valid at 250000Z, upgraded Odessa to a Typhoon. Odessa remained a compact typhoon for the following six days. Of interest in this regard was the change in the outflow channel from equatorward, during the maturation process, to the absence of the channel, during the small, but intense, typhoon stage. Compare Figures 3-12-1 and 3-12-2 to appreciate the shift of outflow.

Odessa's north-northwesterly movement slowed

as it approached the subtropical ridge axis. The critical forecast — whether to go through the ridge or westward under the ridge — was handled well. The primary aids, the One—way Interactive Tropical Cyclone Model (OTCM) and Nested Tropical Cyclone Model (NTCM), (Figure 3-12-3) were at odds apparently due to their respective sensitivities to the narrow ridge to the north. NTCM provided the better guidance in this case. Odessa tracked, as forecast, and turned westward under the influence of the narrow subtropical ridge over Japan.

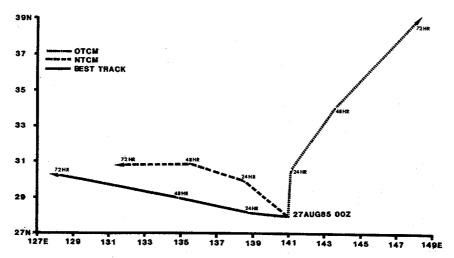


Figure 3-12-3. Primary aids, NTCM and OTCM, provide conflicting guidance. NTCM correctly senses the track to the West. The best track position is a solid line.

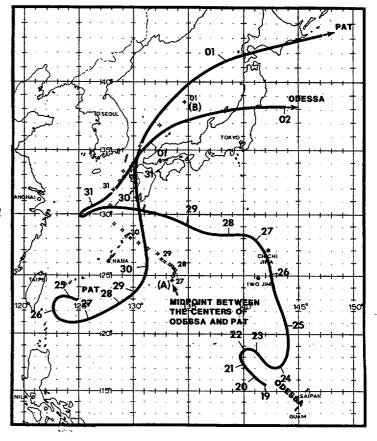


Figure 3-12-4. Best track positions for Pat and Odessa. The small symbols from (A) to (B) are the midpoints between the respective centers of Pat and Odessa at each six hourly interval.

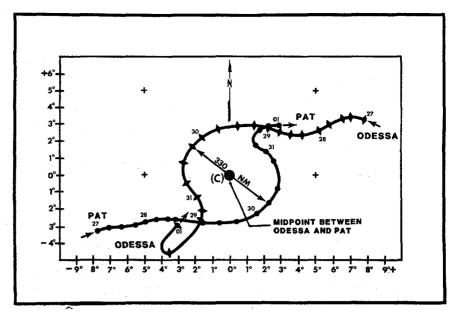
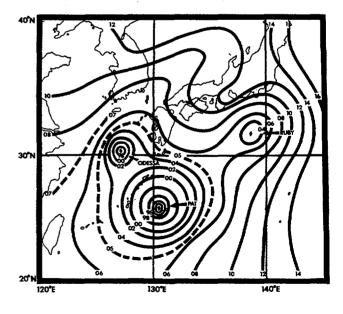


Figure 3-12-5. The singular point at (C) contains all the midpoints taken from the (A) to (B) in the previous Figure 3-12-4. The positions of both Pat and Odessa relative to the midpoint reflect the inward, spiralling interaction between the two systems with time.

As the tropical cyclone pressed ahead on its new track, it began to accelerate in response to the approach of Typhoon Pat from the south. The complex interaction between the spatially proximate cyclones, or binarys, is not readily apparent from Figure 3-12-4, which depicts the superimposed tracks. If the midpoint is determined for each six hourly time period, the locus of midpoints from A to B results (see Figure 3-12-4). When this locus becomes a singular point (C) in Figure 3-12-5 and the respective positions of the two typhoons are replotted

relative to (C), the subtle attraction and cyclonic rotation into a circle of 330 nm (611 km) becomes apparent. It is interesting to compare the relative sizes of Pat, which is average, and Odessa, which is small and compact (reference the surface isobaric analysis in Figure 3-12-6). Returning to Figure 3-12-5, it is important (next) to note the departure of both typhoons from the 330 nm (611 km) circle at 310000z. This was the beginning of extratropical transition and separation. Satellite imagery is provided in Figure 3-12-7.

Figure 3-12-6. Isobaric analysis for 3000007 August indicates the size difference between Pat and the small compact Odessa. The weaker system to the northeast is Tropical Storm Ruby, which remained solitary and apparently didn't enter into the interaction.



The movement of Odessa under the ridge had served the prognostic reasoning well since the 27th. The forecast remained conservative and held to persistence as Odessa began to display erratic behavior, but the ridge to the north had changed. Both aids, OTCM and NTCM, indicated north to northeasterly movement (see Figure 3-12-8). When Pat started accelerating northeastward across Japan, Odessa executed an abrupt turn to the northeast and followed on its heels. Forecasts for Odessa's forward motion proved too slow as it accelerated into

the Sea of Japan and began extratropical transition. Fortunately the system was compact and weakening or damage might have been more widespread. In Kyushu and other southern islands of Japan strong rains and winds from Odessa knocked out power and caused fishing vessels to capsize. Ships remained in port at Sasebo, Japan (WMO 47812) as Odessa passed sixty miles to the north. The final warning was issued at 011200Z September as the extratropical remains of Odessa approached northern Honshu.

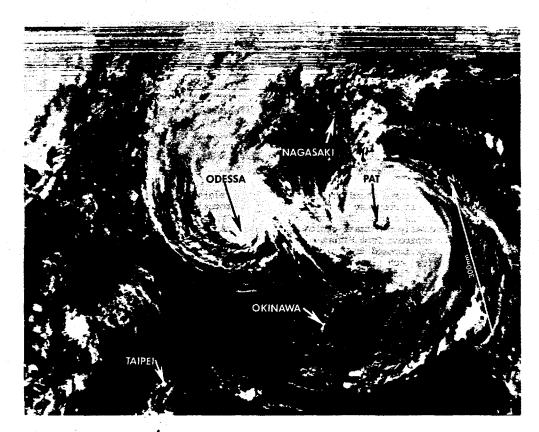


Figure 3-12-7. In this moonlight photo Pat's ragged eye and large surrounding cloud mass dwarf Odessa, which is also at typhoon intensity (3013482 August DMSP visual imagery).

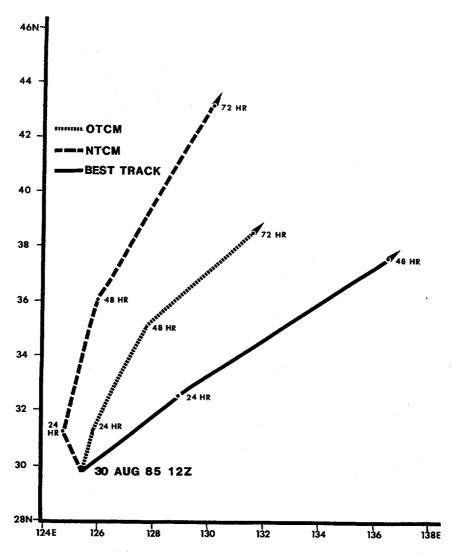
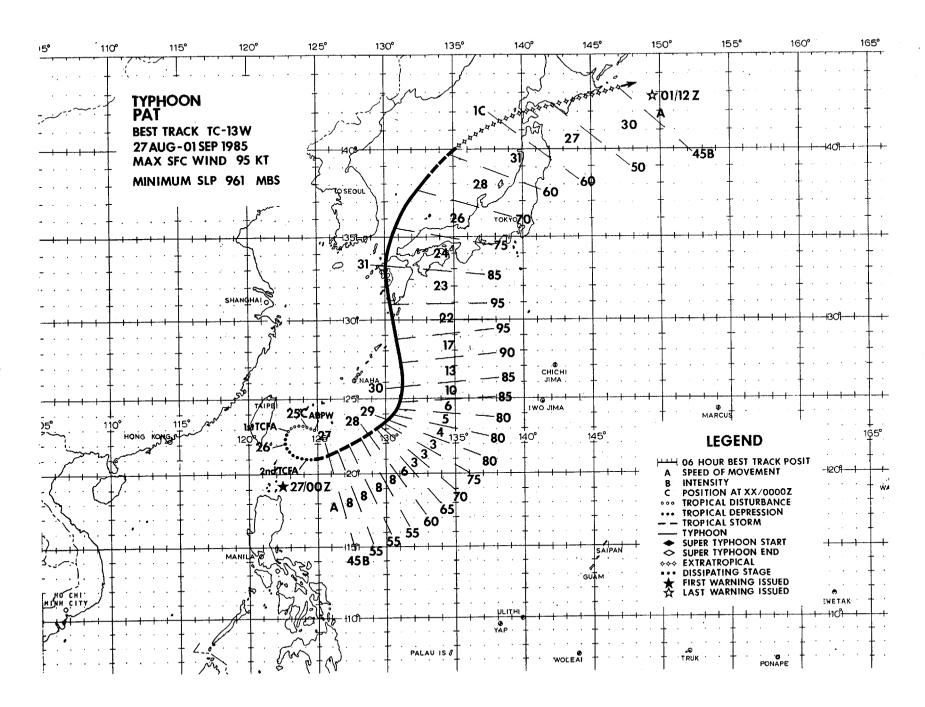


Figure 3-12-8. Primary aids, NTCM and OTCM, at 3012007 August reflect a north to northeasterly track. The best track positions (solid line) indicate the guidance was basically correct.



Typhoon Pat developed east of Taiwan in the monsoon trough a few days after Typhoon Odessa and one day before Tropical Storm Ruby. Pat was significant due to the complex forecasting problems it caused and the damage it inflicted in Japan. The presence of two other storms (Odessa and Ruby) presented a variety of possible forecast interactions. The movement of each cyclone had to be considered in combination with the changing synoptic pattern.

The monsoon trough remained quite active the last two weeks of August. The disturbance which eventually evolved into Pat, originated in the wake of Typhcon Nelson as it moved into eastern China. The 241900Z Significant Tropical Weather Advisory (ABPW PGTW) first identified this disturbance as an area of enhanced convection in the monsoon trough. The convergence in the southwest monsoon flow combined with upper-level divergence provided an environment favorable for continued development.

The first Tropical Cyclone Formation Alert (TCFA) was issued at 251530% when synoptic data indicated the minimum sea-level pressure (MSLP) had dropped to 1002 mb and winds of 25 kt (13 m/s) were present. An aircraft reconnaissance mission flew to investigate the region on the 26th. Although it was unable to locate a circulation, the data collected indicated the disturbance was developing - the MSLP had fallen to 999 mb and 40 kt (21 m/s) winds were observed on the south side of the monsoon trough. As a result, the TCFA was renewed at 261530%. Figure 3-13-1 shows the active monsoon trough at this time. The disturbance is visible on the western side of the imagery with Typhoon Odessa further to the east.

Aircraft reconnaissance early on the 27th located the circulation center, prompting issuance of the first warning, valid at 270000Z. By this time

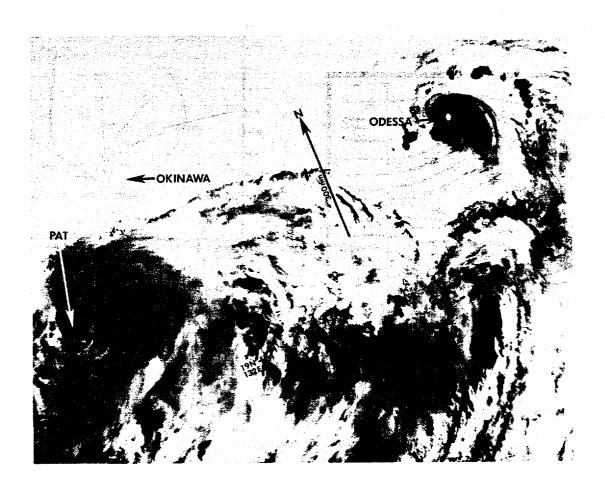
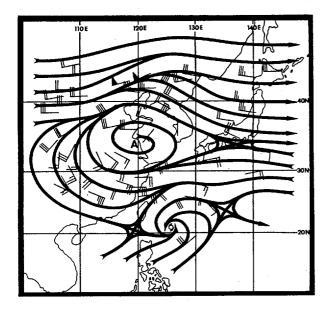


Figure 3-13-1. The tropical disturbance which became Typhoon Pat is visible as an organized area of convection in the monsoon trough. (Typhoon Odessa can also be seen) (2613282 August DMSP infrared imagery).

Pat, due to the enhanced southwesterly monsoon flow, already was at tropical storm intensity. As mentioned earlier, a large number of different factors needed to be taken into account in Pat's forecast.

Determining the direction of the track was the first problem. Because the cyclone was poorly defined on satellite imagery and as a consequence difficult to position, Pat was believed to be moving west-northwest for the first two warnings, when it was actually moving east-northeast. This was critical since persistence from past movement is often a major forecast consideration, especially in the short term forecasts. Figures 3-13-2 and 3-13-3 show some of the data available to the forecasters. A streamline analysis of the 270000Z August 500 mb data has been completed in Figure 3-13-2 to show the location of the subtropical ridge north of Pat. Figure 3-13-3 depicts the first set of forecast aids, using the east-northeast persistence track as a basis, along with the forecast and best track. The most striking feature is, that despite a lot of different options provided by the aids, none really hit the mark at seventy-two hours.

Figure 3-13-2. Mid-tropospheric (500 mb) wind flow at 2700007 August. The dominant synoptic feature is the subtropical ridge extending across China and Japan to the north of Pat.



hit the mark at seventy-two hours.

The forecast called for Pat to move along the monsoon trough to the east-northeast; separate from the trough, and turn back to the west-northwest under the subtropical ridge. This was in reasonable agreement with the One-way Interactive Tropical Cyclone Model (OTCM) model which is usually the best performing forecast aid. The Fleet Numerical Oceanography Center (FNOC) 72-hour 500 mb Navy Operational Global Atmospheric Prediction System (NOGAPS) prognosis called for the ridge to weaken as a trough moved eastward across Mongolia. It appeared, however, that the ridge would remain strong enough to keep Pat south and west of Japan. As it turned out, the prognosis was slow on the movement of the trough, which resulted in the ridge weakening over western Japan.

For the rest of the 27th and all of the 28th, Pat remained in the monsoon trough and continued drifting to the northeast. The forecast situation was further complicated by the presence of Typhoon

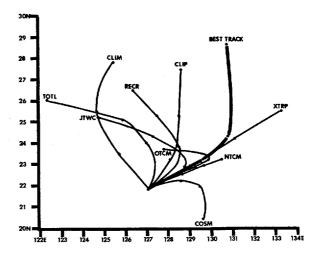


Figure 3-13-3. The primary forecast aids at 2712007, along with the forecast and post analysis best track; all valid for 72-hours. None of the aids are able to provide correct guidance at seventy-two hours.

Odessa and Tropical Storm Ruby. Figure 3-13-4 shows Pat on the 28th - Odessa and Ruby are also visible. Despite the three cyclones being so close, each was moving a different direction. Pat was moving northeastward, Odessa west, and Ruby north-northwest. According to the OTCM, Pat should stay under the ridge. The forecast reflected this guidance and continued to show a turn to the northwest.

The 290600Z OTCM was the first to suggest a track change for Pat, taking it around the ridge and into the Sea of Japan. In analyzing this change, the presence of Odessa was closely examined. Odessa

was moving west and located only 380 nm (704 km) north-northeast of Pat. The OTCM, however, had Odessa moving north into the Sea of Japan, despite the fact Odessa was continuing to move westward under the ridge.

On the 29th, the OTCM guidance was rejected and Pat was forecast to turn to the northwest. It was believed that the ridge over Japan was too narrow for the OTCM to pick up with its relatively large grid spacing. The fact that the OTCM was consistently wrong with Odessa reinforced this belief. In post analysis, however, it is believed Odessa kept moving

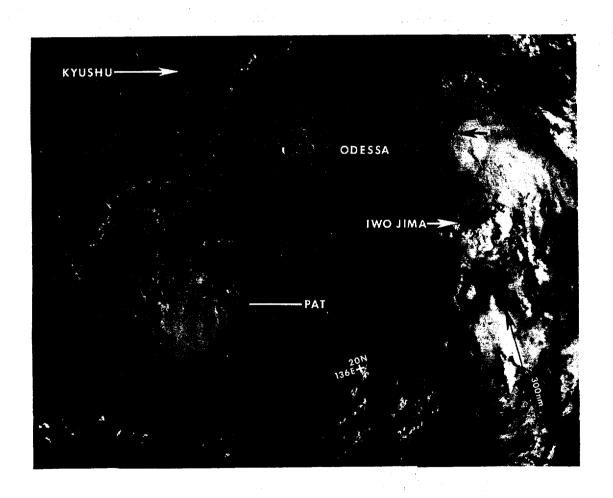


Figure 3-13-4. Three active tropical cyclones south of Japan and all moving different directions. Typhoon Pat is heading northeast, Typhoon Odessa is heading west, and Tropical Storm Ruby is heading north-northwest (282303Z August NOAA visual imagery).

westward at this stage due to binary interaction with Pat rather than from a response to the ridge. Visual satellite imagery early on the 30th (Figure 3-13-5) shows the two were spatially proximate. It is reasonable to believe that if Pat had been the only tropical cyclone in the region at this time, the forecast probably would have been changed on the 29th rather than on the 30th; providing Japan an additional 24 hours of warning time.

With the additional data received on the 30th, it became evident that Pat was not responding to the steering flow of the ridge and was going to hit the Japanese island of Kyushu. The 301200Z forecast was the first to reflect this change. Figure 3-13-6 shows the 500 mb data available at that time. When comparing it with Figure 3-13-2, it is evident that major synoptic changes took place in seventy-two hours. The anticyclone over the China coast was gone and a trough was located just northwest of the Korean Peninsula.

An in-depth look at the interaction between Pat and Odessa, revealed the two typhoons rotated cyclonically around each other. The affect on Odessa's track was greater, however, since Pat was the larger system. Odessa kept moving westward, aided by interaction with Pat. It was interesting to note that Pat did not turn to the north and accelerate until Odessa rotated across to the north-northwest. Then, as soon

as Pat was east-northeast of Odessa, Odessa turned to the northeast and both cyclones accelerated into the Sea of Japan. The closest point of approach between the two was 270 mm (500 km).

At that point, the forecast was straightforward with extratropical transition taking place in the Sea of Japan. Figure 3-13-7 shows Pat during its transition with stable stratocumulus clouds present around a large open center and convection limited to the northeast quadrant. Pat completed extratropical transition at approximately 3121002. The warnings continued warning on the system until it moved across the island of Hokkaido in northeastern Japan. The final warning was issued at 0112002.

Typhoon Pat caused significant damage in southwestern and northeastern Japan; primarily on the islands on Kyushu and Hokkaido. Kyushu was hit the hardest with wind gusts of 107 kt (55 m/s) reported at 301940Z in Kagoshima (WMO 47851). Misawa AB (WMO 47580) recorded sustained winds of 33 kt (17 m/s) with a peak gust to 52 kt (27 m/s) at 010710Z when extratropical remnants of Pat crossed the northern Japanese islands. A total of 23 people were reported killed with over 180 people injured. An estimated 3,000 homes were damaged and 148 watercraft of varying sizes lost. Pat also severely disrupted transportation by land, sea and air.

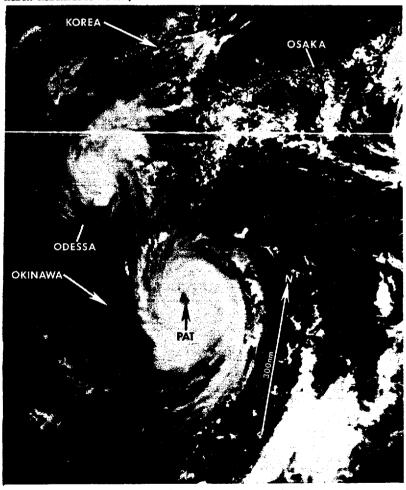


Figure 3-13-5. Typhoon Pat moving northward towards Kyushu and interacting with Typhoon Odessa. Pat is the larger of the two typhoons (3005382 August NOAA visual imagery).

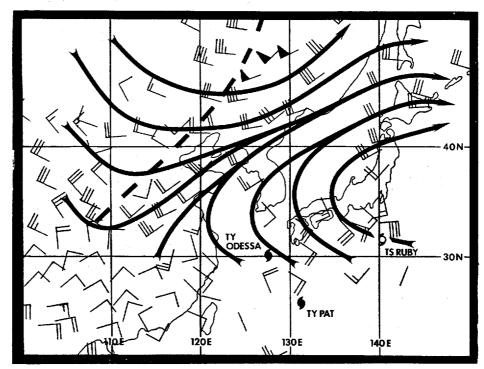


Figure 3-13-6. Mid-tropospheric (500 mb) wind flow at 300000Z August seventy-two hours after Figure 3-13-2. The anticyclone over the coast of China is gone and a trough is moving into the region from the northwest.

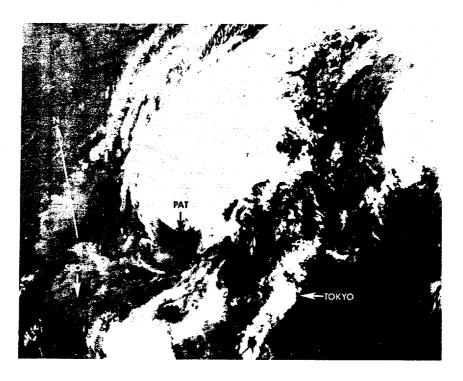
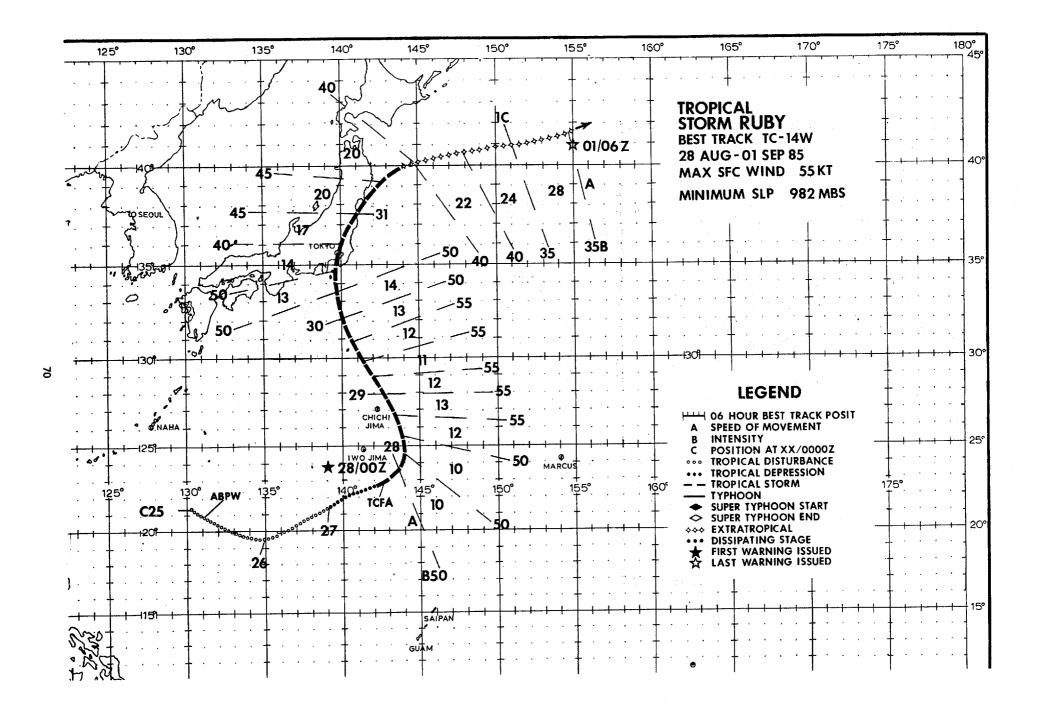


Figure 3-13-7. Pat has nearly completed its transition to an extratropical low in the Sea of Japan. The convection is moving to the northeast leaving behind a broad, exposed low-level circulation center (3118132 August NOAA infrared imagery).



Ruby was the last of three disturbances to develop in the active southwest monsoon trough near 20N latitude during late August. Unlike its' predecessors, Typhoons Odessa and Pat, Ruby did not engage in any complex binary interaction, but appeared to remain a solitary system. Ruby was noteworthy in that it tracked directly over the Tokyo metropolitan area.

On 24 August the well-developed monsoon trough was displaced north of its climatological position and provided large scale low-level converging flow. This flow was the combination of the southwest monsoon and the southeast trades around the southwest periphery of the strong subtropical ridge located east of Japan. The low-level monsoon trough had a narrow, but active, tropical upper-tropospheric trough (TUTT) located aloft and to the north, and the upper-level near-equatorial ridge to the south.

Synoptic data on the 25th of August revealed a small (60 nm (111 km) diameter) circulation with a minimum sea level pressure (MSLP) of 1006 mb 330 nm (611 km) south-southeast of the island of Okinawa. Initial mention of this area appeared on the 250600Z Significant Tropical Weather Advisory (ABPW PGTW). The disturbance weakened a day later. Post-analysis showed the circulation tracked eastward and the convection associated with the disturbance exhibited typical monsoon depression characteristics - some curvature, but the enhanced convection only on the equatorward side of the trough. Increased surface winds of 25 kt (13 m/s) on the eastern side of the

circulation and a steady drop of sea-level pressure to 1002 mb, prompted new mention of the disturbance on the Significant Tropical Weather Advisory (ABPW PGTW) at 270600Z. A Tropical Cyclone Formation Alert (TCFA) followed at 271800Z based on a 25 kt (13 m/s) satellite intensity estimate based on convection that had consolidated into a ragged central dense overcast (CDO) feature. Aircraft reconnaissance was subsequently scheduled for the daylight hours of the 28th of August. At that time the typhocn forecaster was faced with a dilemma: was the flare-up of convection at the end of the monsoon trough just another clash of the low-level southeasterlies, or was the signature that of a maturing tropical cyclone? Ruby's relatively close proximity to Typhoon Odessa (to the northwest) and the apparent weak surface inflow in the northwest quadrant, as depicted by the sparse synoptic data, deepened the uncertainty concerning the intensity of the system.

The question was answered when the initial aircraft reconnaissance mission at 280020Z reported an ellipitical eye forming and a minimum sea-level pressure of 982 mb. Based on this information, the first warning on Tropical Storm Ruby was issued immediately. Satellite imagery showed the cloudiness was come shaped with a large band of convection coming into the center from the southeast. This convective band was positioned over the strong zone of convergence between the monsoon and the southeast trades. The data sparse analysis at 280000Z, shown in Figure 3-14-1, depicts this convergent area. Additionally, aircraft reconnaissance reported that

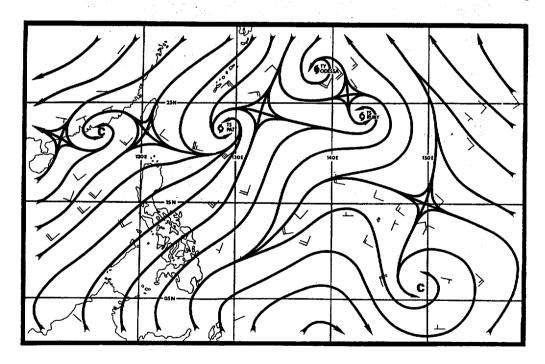


Figure 3-14-1. Surface/gradient analysis at 2800002 showing Tropical Storm Ruby located at the eastern end of the southwest monsoon flow where it converges with the southeast trades.

maximum sustained winds of 50 kt (26 m/s) with gusts to 65 kt (33 m/s) were restricted to the area of the low-level convergence and cloud band. Elsewhere, to the west and southwest, the aircraft found only 15-30 kt (8-15 m/s) surface winds. Figure 3-14-2 shows the proximity of Odessa to Ruby. The continuous vertical shear from the outflow of Odessa to the northwest appears to have hampered Ruby's further development.

During the following twenty-four hours, Ruby turned northwestward and gradually increased speed. Finally, late on the 29th, Ruby appeared to be breaking free of the monsoon trough. The forecast philosophy throughout the 28th and 29th of August was for Ruby, like Odessa, to turn more westward, stay equa-

torward of the narrow subtropical ridge and pass south of Honshu, Japan. This forecast scenario was based on Ruby's interaction with Typhoon Pat. Ruby was forecast to be pulled around the northern periphery of Pat's much larger circulation, which was centered southeast of Okinawa, Japan. Initially, the synoptic situation and, as a result, the meteorlogical reasoning appeared to be similar to that for Odessa and contrary to guidance provided by the best forecast aid, the One-way Tropical Cyclone Model (OTCM). OTCM moved Ruby northward into the subtropical ridge and towards Honshu, Japan, but at a slower speed than it had previously with Odessa. OTCM apparently was responding to the approach of a midlatitude short wave trough. Figure 3-14-3 compares

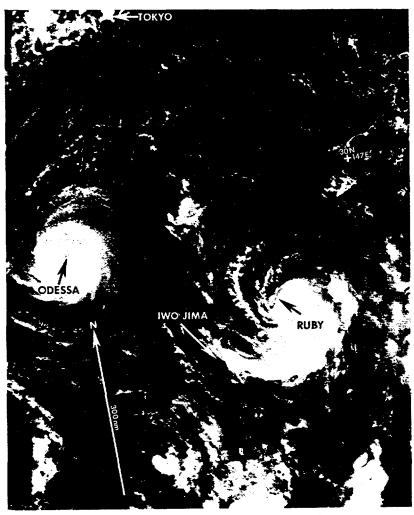


Figure 3-14-2. Nighttime moonlight satellite imagery of Ruby. The close proximity of Odessa to Ruby appears to have hampered Ruby's further development. Ruby is near maximum intensity of 55 kt [28 m/s] {2812487 August DMSP visual imagery}.

OTCM guidance with the forecasts for warnings 04 through 08. By following the forecast philosophy that OTCM still could not resolve the narrow subtropical ridge (due to its larger internal grid spacing), the warnings failed to reflect Ruby's gradual recurvature and subsequent landfall until approximately six hours before the event.

Over a thirty-six hour period, between 281200Z and 300000Z, the Tropical Storm maintained a maximum intensity of 55 kt (28~m/s). Ruby packed 55 kt (28~m/s) winds as it moved south of Tokyo, Japan, but began to weaken just prior to moving into Tokyo Bay

and the Kanto Plain. Satellite imagery showed Ruby lost most of its central convection before making landfall due to interaction with the mid-latitude westerlies. Yokosuka received maximum sustained winds of 33 kt (17 m/s) with gusts to 47 kt (24 m/s) at 301420Z, as Ruby passed 5-10 mm (9-19 km) to the east. During this period Tokyo received three inches (76 mm) of rain and minor damage - trees down, windows broken and power outages for thousands of homes. After twelve hours over land, Ruby moved back into the Pacific and completed extratropical transition at 311000Z.

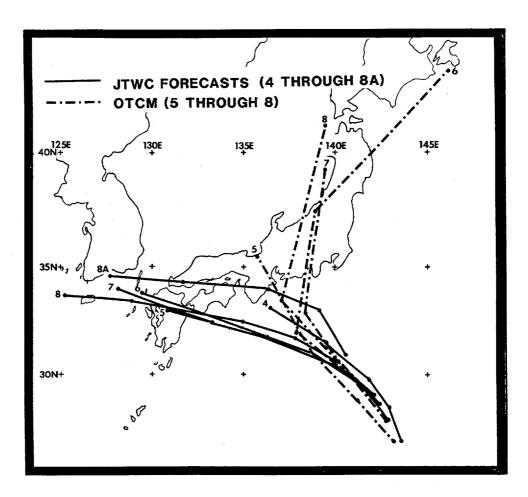
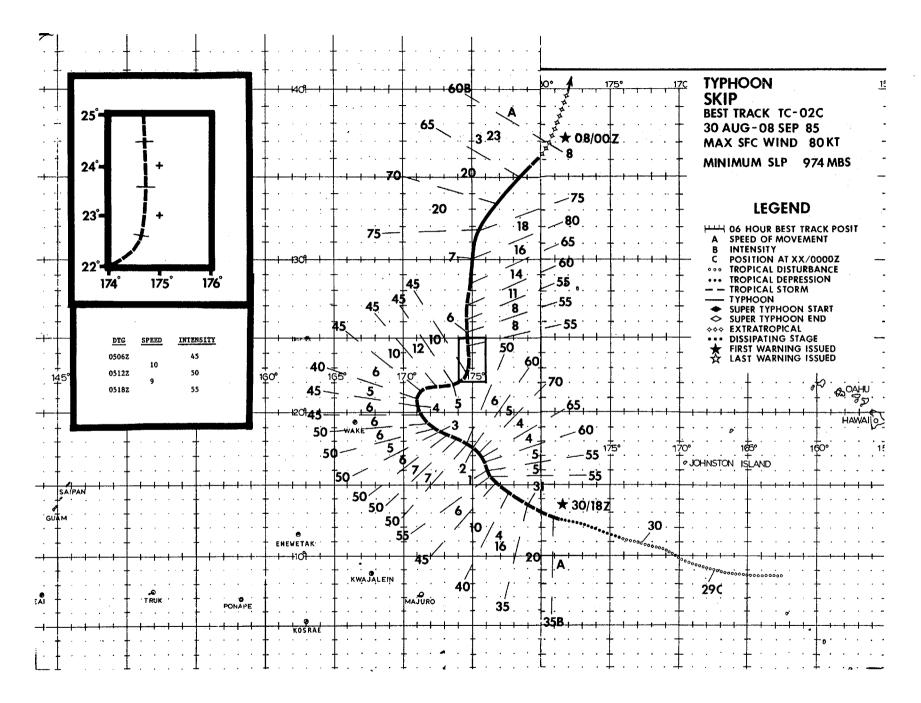


Figure 3-14-3. A comparison of OTCM guidance and the forecasts for five warnings (04 through 08).



Typhoon Skip was the first system in the North Pacific to be warned on by both the Naval Western Oceanography Center (NWCC), Pearl Harbor, Hawaii and the Joint Typhoon Warning Center (JTWC), since Tropical Storm Carmen (02) in early April, 1980. (Note: Tropical cyclones east of the dateline are the responsibility of the Central Pacific Hurricane Center (CPHC), Honolulu, Hawaii, but all warnings and alerts are issued in coordination with NWCC.) Skip developed in the central North Pacific and transited the dateline twice. Additionally, the system achieved typhoon intensity twice: once east-southeast, and then later northeast, of Wake Island.

Satellite imagery detected an area of organized convection along the near-equatorial trough on the 28th of August. This disturbance raced west-north-westward for the next forty-eight hours under pressure from the strong mid-Pacific subtropical ridge. On 30 August, despite the 20 kt (10 m/s) plus movement, satellite images showed the cloud system's organization had increased significantly. This prompted the issuance of a Tropical Cyclone Formation Alert (TCFA) at 3017302 by NWOC. Almost immediately the TCFA was followed by the first warning at 3018002 on Tropical Depression 02C. As Skip transited the dateline from east to west, it became the fourth of what would be a five tropical cyclone scenario in the same ocean basin. The other systems that were part of this unusual event were Odessa, Pat, Ruby near Japan and Tess southwest of Guam.

Responsibility was transferred at the dateline from NWOC to JTWC for the second warning. The following warning upgraded Skip to a tropical storm at 310600Z based on satellite intensity estimates (post analysis later showed that Skip had reached tropical storm intensity six hours earlier, at 310000Z). Coincident with intensification Skip also began to slow its forward motion. The system obtained typhoon intensity at 0112002. A weakening trend set in on 02 September as a mid-level trough approached from the northwest, but Wake Island was still threatened by Skip's approach. Finally, late on the 3rd, Skip turned away from Wake Island and moved towards the north. The Tropical Cyclone then executed an abrupt turn to the east and moved eastward for eighteen hours. During this period the central convection was displaced, by stronger winds aloft, to the east and northeast of the low-level circulation center.

On 05 September, after the passage of a mid-level trough, Skip resumed a northward track through the subtropical ridge and began to intensify and accelerate. A distinct eye developed (see Figure 3-02C-1) as the peak intensity of 80 kt (41 m/s) was reached on 07 September. But this peak was short lived, as increased wind shear aloft from mid-latitude westerlies and interaction with a trailing cold front came into play. Extratropical transition was rapidly completed near the dateline at 072100Z. The warning responsibility was transferred from JTWC to NWCC once again as Skip transited the dateline, this time from west to east, and the last warning followed at 080000Z.

In retrospect, Skip provided its share of fore-casting difficulties due to its location in the data sparse central North Pacific and the complex interaction between mid-latitude troughing and the subtropical ridge. Skip also proved to be a challenge for the 54th Weather Reconnaissance Squadron to fly primarily for two reasons: its remote location, which required staging at the islands of Kwajalein and Wake; and the simultaneous occurrance of the multiple tropical cyclone outbreak in the western North Pacific, that stretched aircraft reconnaissance assets to their limit. Once it became apparent that Wake Island was no longer threatened by Skip, aircraft reconnaissance tasking was cancelled.

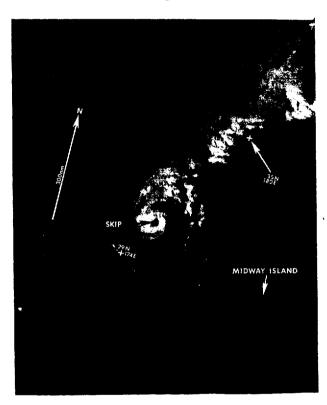
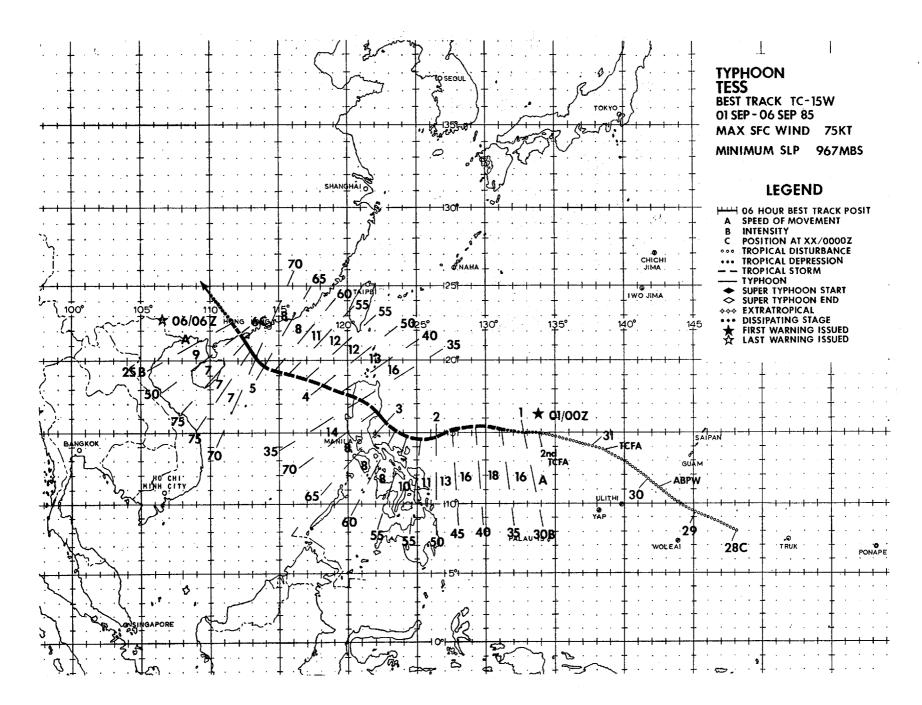


Figure 3-02C-1. Typhoon Skip at maximum intensity with a well defined eye. Skip trails at the end of a cold frontal cloud band that extends to the northeast (070229Z September NOAA imagery).



Typhoon Tess, the first of five significant tropical cyclones to develop in September, originated as a low latitude disturbance southeast of Guam (WMO 91217). Although bringing needed rain to the Philippines during a spell of drier than normal weather, Tess also brought unwanted death and destruction. Four people perished, several were missing and at least 300 were left homeless as this tropical cyclone crossed northern Luzon and disrupted air, ground and sea transportation. In addition, a tornado spawned by Tess, ravaged the coastal town of Lemery, 50 nm (93 km) south of Manila (WMO 98425).

During the last days of August, the monsoon trough was displaced poleward and extended from the northern South China Sea eastward encompassing Typhoons Pat and Odessa, and Tropical Storm Ruby. This left a broad zone of low-level southwesterly flow across the Philippine Sea. The surface/gradient level streamline analysis for 280000Z (Figure 3-15-1) indicated anticyclonic flow over Guam and a cyclonic circulation to the southeast. This cyclonic circulation center, which was moving northwestward, remained at the western end of a band of maximum cloudiness that showed no organization. Initial conditions for development of this low latitude disturbance were unfavorable because of the strong vertical shear from the equatorward outflow channel of the multiple tropical cyclones to the

At 1200Z on 30 August satellite data indicated that the area of cloudiness, then located 300 nm (556 km) west of Guam, had shown a marked increase in organization and amount of convection over the previous 12-hours. Synoptic data at that time confirmed the existence of a low-level circulation, a gradual decrease in sea-level pressure and winds estimated at 10 to 20 kt (5 to 10 m/s). These data prompted issuance of the first of two TCFA's at 301930Z. Aircraft reconnaissance was requested for the next day.

On 010126Z September, the first aircraft reconnaissance flight into the system verified the location of the surface circulation, and found

surface winds of 30 to 35 kt (15 to 18 m/s) and a MSLP of 1003 mb. The first warning on Tropical Depression 15W followed at 010400Z. The center of the depression was located 600 nm (1111 km) east of Manila. The tropical cyclone was moving rapidly westward under the steering influence of the subtropical ridge which lay to the north. As the system matured, satellite imagery detected the formation of a ragged Central Dense Overcast (CDO). Based on the persistent CDO and associated intensification trend, Tropical Depression 15W was upgraded to Tropical Storm Tess at 011200Z (Post analyses showed that Tess actually had reached tropical storm intensity six hours earlier). Aircraft reconnaissance 36 hours later at 022351Z found 65 kt (33 m/s) maximum surface winds and a MSLP of 983 mb. As a result, Tess was further upgraded to typhoon status. At that time, Typhoon Tess was located by a combination of aircraft, satellite and radar information approximately 130 nm (241 km) east-northeast of Manila. Tess was destined to make landfall over Luzon within six hours. As Tess neared Luzon, it took a jog to the northwest sparing the Manila area from the strongest effects of the typhoon.

Landfall over northern Luzon resulted in the temporary downgrading of Tess to a tropical storm at 031200Z. However, within eleven hours Tess had cleared Luzon and was again over water in the South China Sea. Redevelopment to typhoon intensity was forecast and did occur at 050000Z when the Typhoon was located 170 nm (315 km) south of Hong Kong (MMO 45005) (Figure 3-15-2). Tess continued northwestward under the influence of the subtropical ridge and within 24 hours moved inland over the southern coast of mainland China near Yangjiang (WMO 59663), 120 nm (222 km) west-southwest of Hong Kong. The final warning was issued at 060600Z.

Despite passing well south of Hong Kong, Tess generated a peak gust to 60 kt (31 m/s) at the Royal Observatory, and 65 kt (33 m/s) at the Hong Kong International Airport (WMO 45007). Although considerable flooding and crop damage occurred over southern China as Tess moved inland, there were no reports of death or injuries.

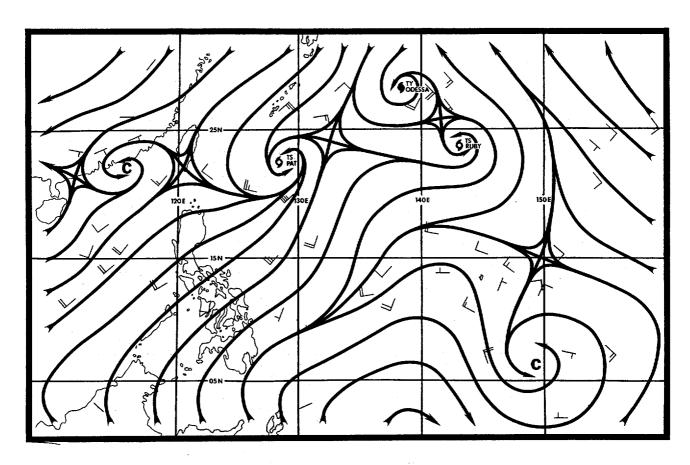
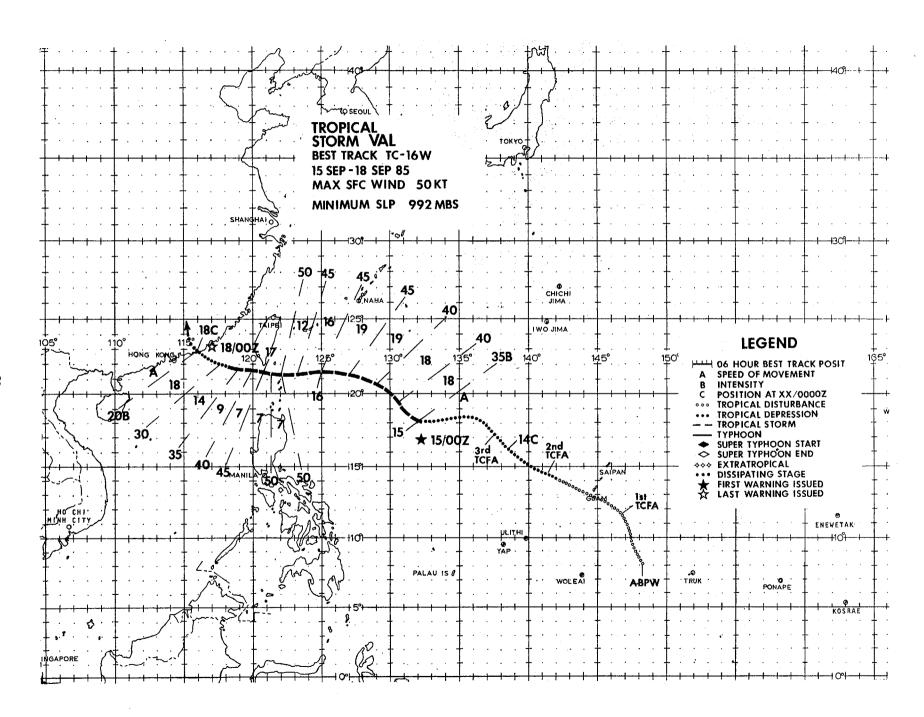


Figure 3-15-1. The 2800007 August surface/gradient level streamline analysis of the southwest monsoonal flow across the Philippine Sea. The low-latitude disturbance southeast of Guam was the precursor of Tess.



Figure 3-15-2. Typhoon Tess, with a ragged eye, near peak intensity. The coastline along the northern Gulf of Tonkin is to the west of Tess' cirrus outflow [0502297 September DMSP visual imagery].



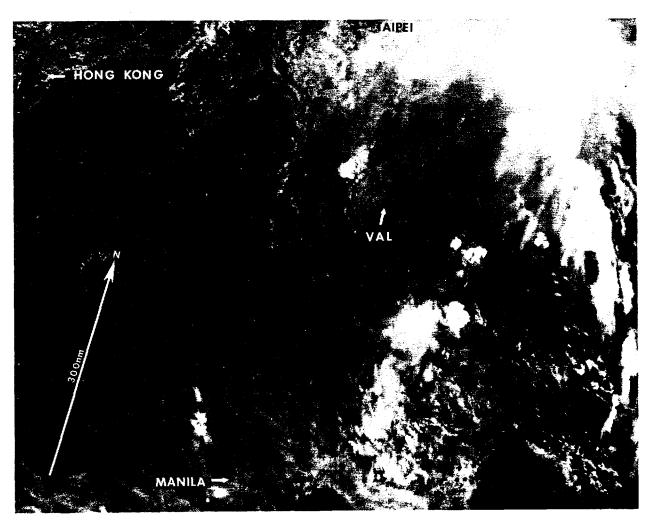
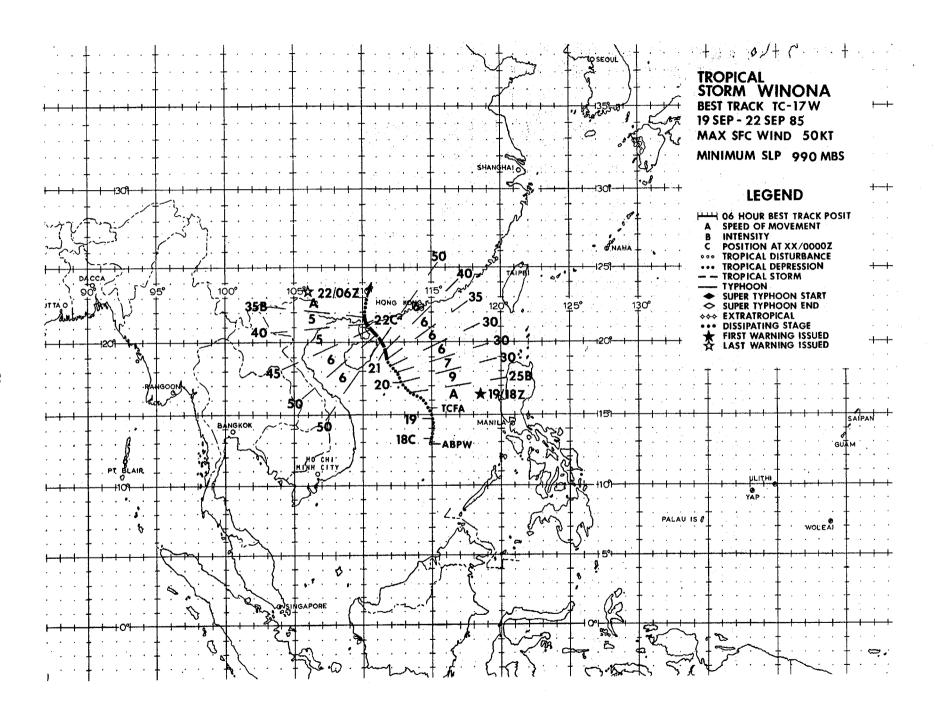


Figure 3-16-1. Tropical Storm Val was the first of trigure 3-16-1. Iropical Storm val was the first of two successive storms to reach a peak intensity of 50 kt (26 m/s). Originating in the monsoon trough southeast of Guam, it slowly developed as it moved northwest out of the trough. After moving into the central Philippine Sea. Val took a more westerly heading, paralleling the subtropical ridge axis to the north. Val remained poorly organized much of its lifetime, with the low-level center often difficult to locate from both satellite imagery and aircraft reconnaissance data. The above imagery shows one of the few times the low-level center could be identified. As Val approached Taiwan, its circulation became further disrupted. The low-level circulation center tracked west while most of the convection became displaced to the northwest and enhanced by Taiwan's mountainous terrain. The convection attempted to redevelop over the low-level wind center as Val transited the Luzon Straits, but without success. As a result, Val weakened prior to making landfall on mainland China and was not identifiable as a tropical cyclone after 1800002. Due to the threat posed by Val, Hong Kong (WMO 45005) did go to Condition of Readiness II at 1615002. However, Val dissipated earlier than anticipated and no significant weather was reported (1605582 September NOAA visual imagery).



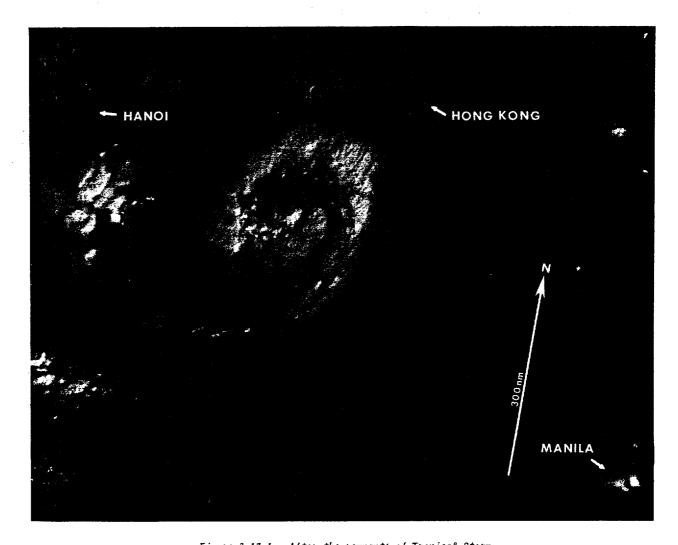
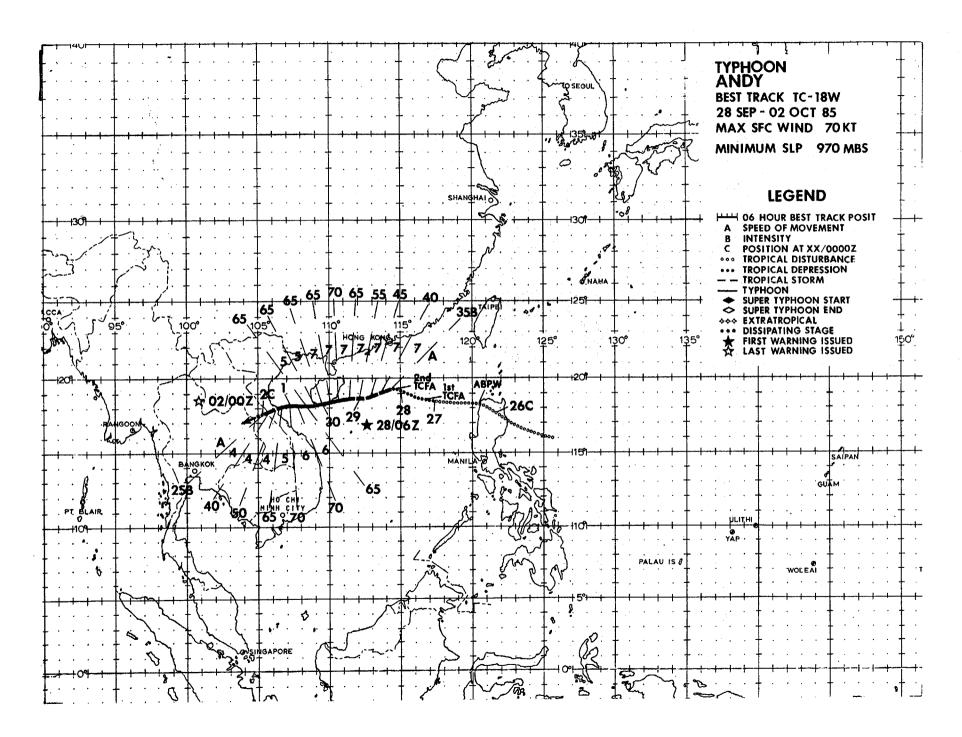


Figure 3-17-1. After the remnants of Tropical Storm Val dissipated over eastern China, excess vorticity at the base of the monsoon trough formed a surface circulation in the central South China Sea. Two days later this circulation intensified into Tropical Storm Winona. Winona tracked to the north-northwest as it intensified, moving around the western periphery of the subtropical ridge which was extending westward across the Philippine Sea. Winona made landfall as a 50 kt (26 m/s) tropical storm just west of Thanjiang, China (WMO 59658) at about 2120002. There were no reports of damage as it moved inland and dissipated. The satellite imagery above shows Winona just prior to reaching maximum intensity. Note the well-defined convective banding surrounding the center of the storm [2102082 September DMSP visual imagery).



Typhoon Andy was a relatively short-lived tropical cyclone. Developing in the South China Sea, Andy transited uneventfully to the west-southwest. Although the cyclone made landfall twice at or near typhoon strength, there were no reports of serious damage or injuries.

The disturbance that eventually developed into Typhcon Andy was first detected late on 25 September as a small area of intense convection in the monsoon trough east of the Philippines. This compact CDO feature was part of a larger area of disturbed weather which had persisted east of Mindanao for several days. The southern portion of this large area had been the subject of a TCFA on the 24th and 25th. When the area of convection moved northwest across northern Luzon early on the 26th and entered the South China Sea, development of Andy began in earnest.

Between 260000Z and 270000Z the tropical disturbance moved to the west-northwest and slowly consolidated. Coincidently, an early season surge in the northeast monsoon was underway generating 25 to 40 kt (13 to 21 m/s) winds across the Taiwan Straits and the northern South China Sea. This surge most probably contributed to the excess low-level cyclonic vorticity needed to produce a lee-side circulation off the northwest coast of Luzon. The development of this low-level vortex is thought to have aided the development of Andy. At 270000Z, Dvorak intensity analysis of the cloud system estimated 30 kt (15 m/s) surface winds were present. Sparse supporting synoptic data at that time showed only 20 to 25 kt (10 to 13 m/s) surface winds near the disturbance's center. However, due to the improved organization and the expectation for further development, a TCFA was issued at 270300Z. Less than three hours later, satellite imagery revealed the presence of a partially exposed low-level circulation center.

Over the next 24 hours, the system continued to move to the west-northwest in the monsoon trough. Despite the presence of the low-level circulation center on satellite imagery on the 27th, aircraft reconnaissance early on the 28th was unable to find a surface circulation. But, because winds of 25 to 30 kt (13 to 15 m/s) and a 1001 mb MSLP were observed, the TCFA was reissued at 280300Z.

The first warning on Andy, as Tropical Depression 18W, followed several hours later at 280600Z. By that time it had become apparent the system was more than just a benign circulation in the monsoon trough. Dvorak intensity analyses by two different tactical DMSP sites estimated the intensity at 30 and 45 kt (15 m/s and 23 m/s). As Tropical Depression 18W matured, it came under the influence of low- to mid-level ridging to the north. The Tropical Cyclone responded by turning to the west-southwest. It moved in this direction for the remainder of its lifetime.

Continuing to intensify, Andy attained typhoon strength about 24 hours after the first warning, at 290600Z. At that time, the Dvorak intensity analysis was a T4.0, supporting 65 kt (33 m/s) surface winds. Andy's intensification to a typhoon coincided with the formation of a small ragged eye. Typhoon Andy first made landfall on the southern tip of Hainan Island just east of Yai-Xian (NMO 59948) at 291800Z with maximum sustained winds of 65 kt (33 m/s), gusts to 80 kt (41 m/s). After a glancing blow to Hainan (Figure 3-18-1), Andy continued west-southwestward across the southern Gulf of Tonkin and reached its maximum intensity of 70 kt (36 m/s) at 3018002. Typhoon Andy made landfall as a minimal strength typhocn approximately 30 nm (56 km) north of Dong Hoi, Vietnam (WMO 48848) at 011000Z. The tropical cyclone rapidly weakened as it moved inland. last warning, issued at 020000Z, downgraded Andy to a 25 kt (13 m/s) tropical depression as it dissipated over central Laos.

Although a tropical cyclone of this magnitude would normally be expected to cause widespread damage, none was reported. Extensive preparations made prior to the cyclone's arrival probably lessened the impact of Andy's passage.

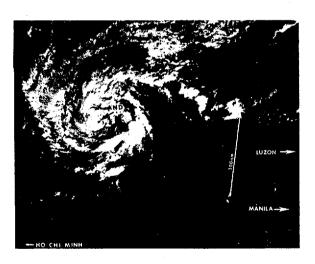


Figure 3-18-1. Typhoon Andy, with a small eye, as it entered the Gulf of Tonkin (3002282 September DMSP visual imagery).

Typhoon Brenda developed from a broad, persistent area of convection in the monsoon trough. Its life was influenced by two mid-latitude troughs. The first caused erratic early movement. The second caused Brenda to recurve into the mid-latitude west-erlies, a track which was well-forecast by the Joint Typhoon Warning Center.

The disturbance that would become Brenda was first noticed on 25 September as a large area of persistent convection southeast of Truk (WMO 91334). (Further west, the early signs of Typhoon Andy were evident in the western Philippine Sea). Although the system was disorganized, good upper-level outflow was evident. The proximity of the tropical disturbance to Guam and its impressive satellite signature resulted in the issuance of the first of four TCFAs at 252230Z. Aircraft reconnaissance early on the 26th was unable to locate a surface circulation, but did find a broad area of troughing. The area tracked northwest through the 26th, with the convec-

tion covering a broad area and upper-level outflow remaining favorable. This prompted the reissuance of the TCFA, at 262230Z, but once again aircraft reconnaissance early on the 27th was unable to locate a circulation. This scenario repeated itself the next day. Finally, late on 28 September, the deep convection began to show an increase in amount and organization. A few hours later, after the fourth TCFA was issued, aircraft reconnaissance found a closed 15 kt (8 m/s) circulation at 290329Z. The slow development of the disturbance was surprising, since it appeared that all the necessary ingredients for development were present. It is thought that the extemely broad size of the disturbance may have prevented a faster development, which is more typical of WESTPAC tropical cyclones (Figure 3-19-1).

The first warning on Brenda was issued at 292347Z, valid at 291800Z, based upon aircraft reconnaissance which located a 20 kt (10 m/s) circulation and a MSLP of 1000 mb - a drop of three



Figure 3-19-1. Visual imagery of the Tropical Pisturbance at the time aircraft reconnaissance first located a surface circulation center. This extremely broad area of convection showed little change from the 25th through the 28th. Most of the curvature due to an upper-level anticyclone. The abnormally large size of the disturbance may have slowed development (2901072 September DMSP visual imagery).

millibars in less than 24-hours. Initial forecasts called for the system to gradually increase in intensity, move west-northwest and cross northern Luzon. This was based on the expectation that the subtropical ridge would maintain itself north of Brenda. But, Brenda moved west-southwest followed by a brief turn to the northwest before apparently completing a small cyclonic loop on 1 October. These movements were related to the passage of a mid-latitude trough to the north. Although the trough did not completely weaken the ridge, it eroded the ridge enough to affect the steering flow. As a result, Brenda moved slowly and erratically. By the 2nd, the trough had passed to the northeast and the subtropical ridge began to rebuild. Brenda responded by turning back to the west-northwest while continuing to intensify,

eventually reaching typhoon force at 011800Z. At that point it appeared that Brenda would miss northern Luzon and track just south of the island of Taiwan.

On 2 October, aircraft recommaissance determined that the Typhoon had increased in strength and was more circular. With another mid-latitude trough approaching from mainland China, it appeared that Brenda's track would again be affected in 24- to 36-hours. Using this information and the belief that the subtropical ridge was not going to build far enough west to drive Brenda through the Luzon Straits, the forecast track was revised to recurve Brenda around the end of the ridge just east of Taiwan. Figure 3-19-2 shows the forecast aids

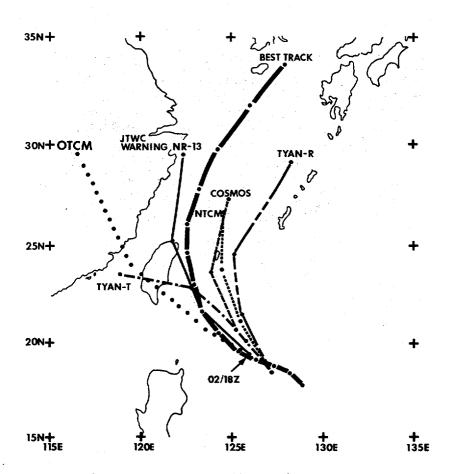


Figure 3-19-2. Forecast aids at 24-hour intervals, when the first recurvature forecast was issued, are compared to the warning and Brenda's best track. While some aids (NTCM, COSMOS and TYAN RECURVER) forecast recurvature; OTCM, JTWC's best aid during the past few years fails to indicate recurvature. All aids are slow in forecasting the speeds of movement during recurvature.

available to the TDO when the first recurvature forecast was issued. This forecast differed considerably from those of other warning agencies, but proved to be quite accurate, although the speed of movement was slow.

Brenda had a unique signature on satellite imagery because of its extremely large eye. Aircraft reconnaissance confirmed the existence of a large banding eye on 3 October. Satellite imagery showed a ragged eye, often larger than 60 nm (111 km) in diameter (Figure 3-19-3). The large eye lasted from 030000Z until Brenda moved around the ridge and began to accelerate into the westerlies on 4 October.

During recurvature, Brenda performed as forecast. It reached a maximum intensity of 90 kt (46 m/s) at 030600Z, and maintained that intensity for 24-hours, as it turned to the north and passed east of Taiwan. Under the influence of the midlatitude westerlies north of the ridge axis, Brenda turned to the northeast and accelerated, passing just south of Korea on the 5th. Extratropical transition was underway by 0500002 and the final warning was issued at 0506002. The extratropical remains of Brenda passed through the Korea (Tsushima) Strait and entered the Sea of Japan at 051200Z before slowing down and weakening.

Known damage from Brenda was limited to the southern Korean Peninsula and adjacent islands.
Nearly 12 inches (30 cm) of rain was reported over a large area. The Korean National Disaster Relief Center reported 14 dead, 43 missing, and damage to 167 houses, 630 watercraft, and 34,600 acres (14,000 hectares) of rice paddies as a result of the storm's passage. Damage was greatest on the island province of Cheju and the two provinces near the coastal city of Pusan (WMO 47153) in the southeast corner of the peninsula.

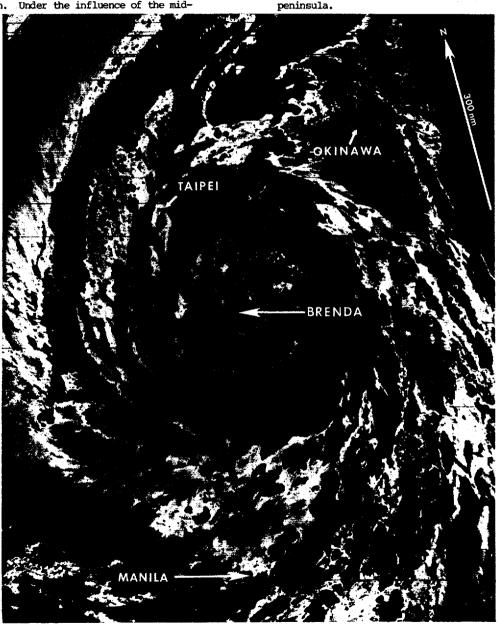


Figure 3-19-3. Nighttime enhanced infrared imagery of Brenda's large eye. The eye is 75 nm [139 km] in diameter (0314072 October DMSP enhanced infrared imagery).

Typhoon Cecil was one of several tropical cyclones to hit Vietnam during the autumn of 1985. In its wake, more than 700 were left dead and half-a-million homeless. The dollar value of the damage caused by Cecil has been estimated to be in excess of 65 million dollars.

Typhoon Cecil began innocently enough as an area of increased convective activity south of the Caroline Islands on the 8th of October. Satellite imagery at 080600Z showed a large area of strong, slightly curved convection extending along 04N from 136E to 145E. Supporting synoptic data showed convergent cross-equatorial flow. Over the next 72-hours, the tropical disturbance tracked to the westnorthwest towards northern Mindanao, passing just south of the Belau (Palau) Islands late on the 9th. It maintained good upper-level outflow, enhanced by upper-level troughing to the north, and became more organized at the lower levels. Aircraft reconnaissance first located a surface circulation east of Mindanao at 110222Z. Maximum sustained winds at that time were 15 to 20 kt (8 to 10 m/s) and the MSLP was estimated to be 1006 mb.

Further organization of the low-level center was slowed as the disturbance passed through the islands of the southern Philippines. With continued development considered likely once the disturbance crossed the Philippines, a TCFA was issued at 120330Z for the northern Sulu Sea westward into the South China Sea. By 121200Z the disturbance had moved west of Palawan Island into the South China Sea. Little damage was sustained in the southern Philippines due to its passage. By then, satellite imagery indicated that the system had begun to consolidate over water, prompting JTWC to issue the first warning on Tropical Depression 20W at 121200Z. Initially, Cecil was expected to consolidate rapidly and traverse the South China Sea making landfall within 72-hours of the first warning over southern Vietnam.

Post-analysis indicated that Cecil was already at tropical storm intensity upon emerging into the South China Sea. It then turned to a more northwesterly heading and tracked along the southern edge of a ridge over eastern China and the East China Sea. Cecil steadily intensified as it moved northwest, reaching typhoon intensity by 131800Z. By that time satellite imagery showed that Cecil was slowing to 7 kt (13 km/hr) and developing an eye. The slower movement and a slightly more northward track meant that Cecil would not make landfall as early as previously expected. Aircraft reconnaissance at 130824Z confirmed the presence of a 20 nm (37 km) diameter eye and a minimum sea-level pressure of 984 mb.

Cecil took three days to cross the South China Sea. During the latter half of this transit, Cecil maintained an eye and continued to intensify at a steady rate. The low- to mid-level ridge was not as strong as forecast, so Cecil maintained a track to the northwest. As Cecil passed south of Hainan Island on the 15th (Figure 3-20-1), it was at its maximum intensity of 100 kt (51 m/s). By 151200Z, interaction with the topography of Vietnam and Hainan was preventing further intensification by hampering low-level inflow. The mid-level subtropical ridge remained across the island of Taiwan and mainland China. This turned Cecil on a more westerly track, resulting in landfall about 40 nm (74 km) north of Hue (WMO 48852) at 152200Z. Cecil continued to move west and weaken, dissipating over the Laos/Thailand border on the 16th. The final warning was issued at 160600Z.

Officials in Binh Tri Thien Province in central Vietnam described Typhoon Cecil as "the worst natural disaster yet in central Vietnam ...causing... damage worth more than 65 million dollars". At least 702 people were confirmed dead with 128 still missing and 560,000 left homeless. In addition to destroying or damaging 200,000 or more homes, Cecil also destroyed about 850 fishing boats and other small vessels. Winds of up to 90 kt (46 m/s) combined with flooding to ruin 70,000 hectares (172,900 acres) of rice and other crops. A 200 bed hospital was destroyed, five other hospitals damaged, and 250 dispensaries swept away, along with almost 9,000 classrooms with accompanying school equipment and textbooks. Dikes, canals, and pumping stations sustained almost one million dollars in damage. Telephone lines, electricity service, and roadways were cut, bringing business to a halt and hampering relief efforts. It will be many years before this province, one of Vietnam's poorest, recovers from the accumulated affects of this and the other tropical cyclones which affected Vietnam in 1985.

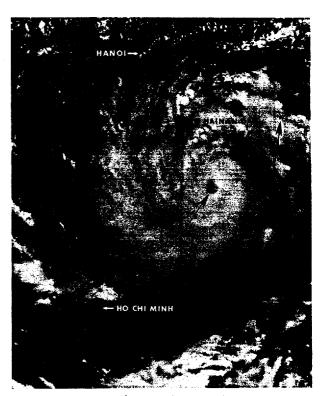


Figure 3-20-1. Typhoon Cecil at maximum intensity passing south of Hainan Island (1507332 October NOAA visual imagery).

After Typhoon Brenda, which had developed in the low-level southwest monsoon trough, completed extratropical transition on the 5th of October, the mid-level subtropical ridge became well-established over the Northwest Pacific. This synoptic feature would confine the development of tropical cyclones to low latitudes near 10N in the near-equatorial trough. Also coincident with Brenda's movement to the north was the replacement of the low-level southwest monsoon flow over the South China Sea with north-to-northeasterly flow off of the Asian continent.

Typhoon Dot was the only super typhoon (intensity equal to or greater than 130 kt (67 m/s)) of the 1985 WESTPAC season. It intensified (deepened) explosively causing intensity forecast difficulties. Other distinguishing characteristics were the small

size of the area of intense convection, the small radius of maximum wind, and the absence of low-level southwest monsoon inflow. Also of interest was the large wind radius in the northwest semicircle (when it was located southeast of Luzon) where surface winds were enhanced by a strong pressure gradient between the tropical cyclone and a polar high pressure cell located near 40N 110E.

Dot was first detected as a tropical disturbance in the near-equatorial trough, 150 nm (278 km) southeast of Ponape (WMO 91348) on the 11th of October. Figure 3-21-1 shows the disturbance on the 12th of October exhibiting signs of organization in its upper-level outflow. The system moved west-northwest and reached tropical storm intensity on the 13th south of Guam.

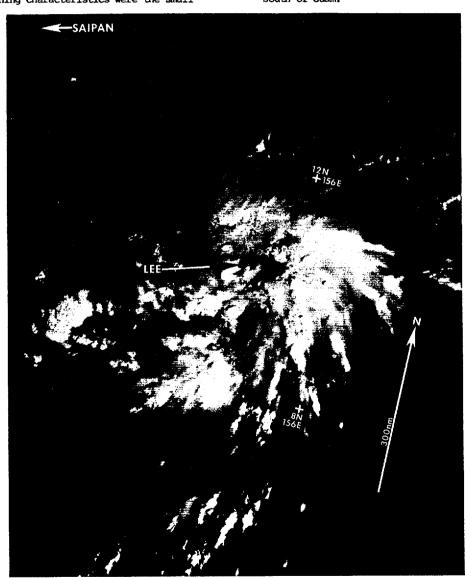


Figure 3-21-1. Super Typhoon Pot as a disturbance in the near-equatorial trough with signs of organized upper-level outflow [120006Z October DMSP visual imagery].

The track forecasts for Typhoon Dot did not present any significant difficulty for the forecasters at JTWC. Figure 3-21-2 shows that the mid-level easterlies dominate the Trust Territories westward through the Philippine Islands and into Southeast Asia at 120000Z. With no change expected in the orientation or strength of the ridge, a west-northwest track at 10 to 20 kt (19 to 37 km/hr) under this ridge was considered to be the best forecast. This was in agreement with climatological and analog forecast guidance. The two numerical models, OTCM (One-way interactive Tropical Cyclone

Model) and NTCM (Nested Tropical Cyclone Model), were of little help during the crucial first four days of forecasts (when Dot was approaching the Philippines). Due to computer problems at Fleet Numerical Oceanography Center (FNOC) the older Primitive Equation (PE) model was run in place of the Navy Operational Global Atmospheric Prediction System (NOGAPS). Later, it was determined that OTCM, when runing with data from the PE model, didn't have access to the necessary data fields. Subsequently, OTCM was modified to accept the needed data.

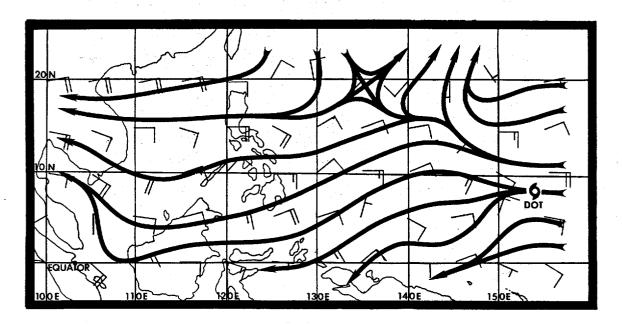


Figure 3-21-2. 400 mb Numerical Variational Analysis (NVA) at 120000Z October showing easterlies over Dot's future track to the west-northwest.

The one aspect of Typhoon Dot that did present considerable forecast difficulty was intensity. In the twenty-three hour period between 1500222 and 152342Z Dot's central sea-level pressure dropped from 969 mb to 903 mb (a decrease of 66 mb). This translates to a drop of approximately 2.8 mb/hour. This meets and exceeds the rate of 2.5 mb/hr (sustained for at least 12 hours) that Holliday and Thompson (1979) used to define explosive intensification (deepening). JTWC uses a technique (Dunnavan, 1981), in which the 700 mb equivalent potential temperature (Theta-E, a measure of the tropical cyclome's thermodynamic energy based on the central 700 mb temperature and dewpoint) and the central sea-level are compared pressure to forecast explosive intensifica-

tion. The technique calls for intensification to below 925 mb (how far below can be estimated from the technique also) whenever the plots of central sealevel pressure and Theta-E intersect near the critical values of 950 mb and 360 degrees Kelvin (both values being statistical means derived from past intense storms). Figure 3-21-3 is a plot of Dot's central sea-level pressure and Theta-E during the period 140530Z to 180828Z. At Point A (142130Z), the two lines show a tendency to intersect (notice extrapolation to Point A'). However, Point B (150022Z) reflects a decrease in Theta-E. Then, at Point C (150615Z), this trend reverses and again extrapolation to Point C' would indicate intersection. Point D (150853Z) shows a slight

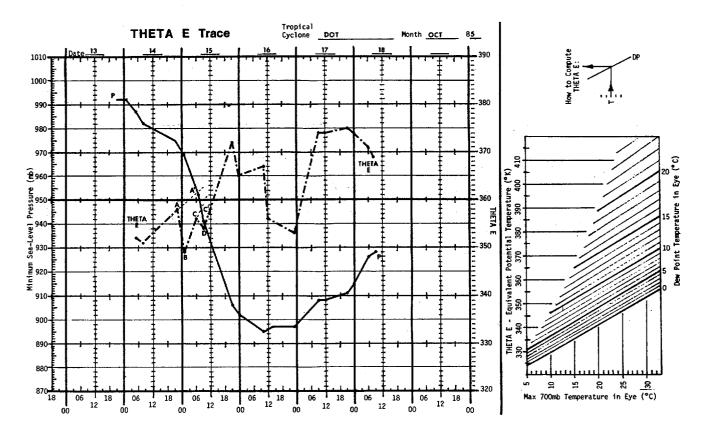


Figure 3-21-3. Plot of Dot's central sea-level pressure and central 700 MB equivalent potential temperature during the period 140530Z to 180828Z October.

decrease in Theta-E and no intersection. The next available aircraft reconnaissance data was not received until 152102Z, and by that time Dot's central sea-level pressure had plummeted to 906 mb and the central 700 mb temperature had soared from 20 Celsius to 30 Celsius (yielding a Theta-E of 372 K when paired with the dewpoint temperature of 11 Celsius). This forecast method is a reliable one in most instances. However, Typhoon Dot demonstrates a situation when the lack of timely aircraft data prevented the effective use of the technique. In post-analysis, if pressure, temperature, and dewpoint data had been available around 151200Z it is a distinct possibility that the intersection of the central sea-level pressure line and the Theta-E line would have been observed.

The reliability of this forecast technique was mentioned earlier. However, in addition to the timing problem already mentioned, a couple of factors

should be pointed out. First, the computation of Theta-E is very sensitive to dewpoint temperature (and to a lesser degree ambient temperature). The dewpoint measurement is also sensitive to a sometimes non-homogeneous distribution of moisture in the storm's center. Second, a rarer but sometimes complicating factor is the complexity and delicacy of the dewpoint hygrometer which is an alternately cooled/heated mirror coupled with a thermistor. The dewpoint temperature is recorded when a thin film of dew forms on the mirror. Malfunctions of the instrument occasionally occur.

To give the reader an indication of what impact not knowing that Dot was going to explosively deepen had on the intensity forecasts can be seen in Figure 3-21-4. The graph depicts the best track intensities (at six hour intervals) for the period 131800Z to 181200Z compared to the corresponding 12-,24-,48-, and 72-hour intensity forecasts. Twelve-hour fore-

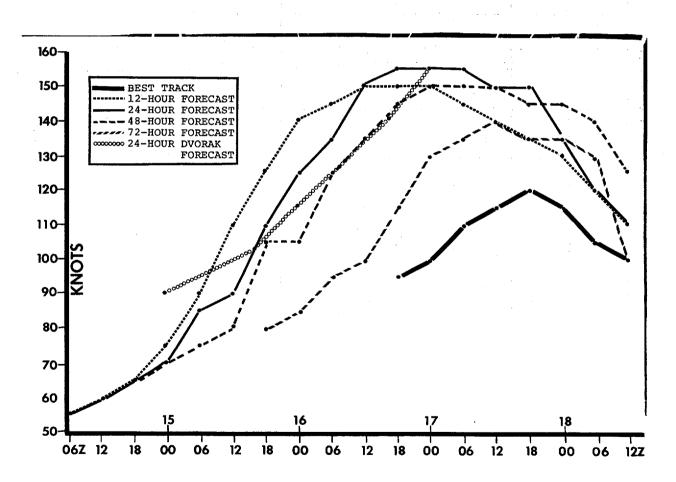


Figure 3-21-4. Plot of Dot's best track intensities at six-hour intervals and corresponding 12-,24-,48-, and 72-hour forecast intensities for the period 131800Z to 181200Z October 85.

casts for the period 151200Z through 160600Z were 20, 15, 15, and 10 kt (10, 8, 8, and 5 m/s) low. For the same period twenty-four hour forecasts were 30, 20, 35, and 20 kt (15, 10, 18, and 10 m/s) below the best track intensities. From the graph one can see that the 24-hour forecast intensity curve is very close to the Dvorak forecast intensity curve. This is usually the case since the Dvorak model is the main JTWC 24-hour intensity forecast tool. The problem with explosive intensification really starts showing up at the 48-hour forecast period. The 48-hour intensity forecasts during the period 151800Z through 161800Z October were 45, 55, 50, 50, and 35 kt (23, 28, 26, 26, and 18 m/s) too low. The three 72-hour forecasts that were effected by the explosive deepening were for the period 161800Z through 170600Z Oct and were 55, 50, and 35 kt (28, 26, and 18 m/s) too low.

After Dot had explosively deepened, the intensity forecasts reflected the storm's high initial intensity and the forecast errors decreased signi-

ficantly with the average 12-hour intensity forecast error for the period 140600Z through 181200Z (18 cases) being 5 kt (3 m/s), the average 24-hour error for the period 141800Z through 181200Z (16 cases) being 14 kt (7 m/s), the average 48-hour error for the period 151800Z through 181200Z (12 cases) being 24 kt (12 m/s), and the average 72-hour error for the period 161800Z through 181200Z (8 cases) being 28 kt (14 m/s). The point being made is that a forecaster doesn't necessarily have to know 72 hours ahead of time that a system is going to explosively deepen, but if he knows 12 or 24 hours ahead of time then the longer range forecasts made during that period will reflect the higher storm intensity and be more accurate.

Figure 3-21-5 shows Super Typhoon Dot at maximum intensity with a well-defined eye and intense convection confined to a small area around the system. Aircraft reconnaissance on the 16th and 17th of

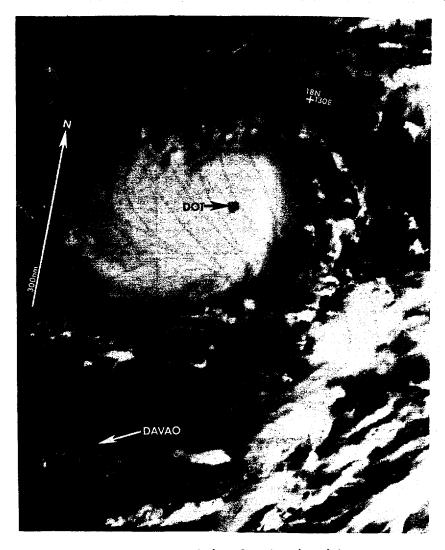


Figure 3-21-5. Super Typhoon Dot at maximum intensity with a well-defined eye and small surrounding ring of intense convection (1701472 October DMSP visual imagery).

October consistently located the maximum surface winds 5 to 10 nm (3 to 5 km) from the center and radar eye diameters of 10 to 15 nm (5 to 8 km).

Figure 3-21-6 shows the surface wind circulation pattern around Dot (while it was southeast of Luzon) at 181200Z October. Strong winds extended out much further in the northwest semicircle where the surface winds were from the north to northeast. This increased flow resulted from a strong pressure gradient that existed between Dot and a polar high-pressure cell located near 40N 110E. The figure also shows the absence of any enhanced low-level southwest monsoon flow over the South China Sea.

The threat posed by Super Typhoon Dot caused all U.S. military installations in the Philippines to be placed in Tropical Cyclone Condition of Readiness I and resulted in the evacuation of aircraft from Cubi Point NAS and Clark AB, and the movement of several ships from Subic Bay. Seventy-four peoples were reported killed, more than 50,000 left homeless, and damage to buildings and crops estimated at 1.3 million dollars. NAVOCEANCOMFAC Cubi Point reported a peak gust of 19 kt (10 m/s) and Det 5, 20WS at

Clark AB reported maximum sustained winds of 27 kt (14 m/s) with a peak gust of 44 knots (23 m/s). Dot was a very intense typhoon but the damage done in the Philippines was certainly limited by the storm's small diameter of maximum wind, its small area of intense convection, its path of approach to Luzon (this kept most of the low-level flow parallel to the mountainous terrain, reducing orographically-enhanced rainfall), and the absence of enhanced low-level southwest monsoon flow.

After entering the South China Sea late on the 18th of October with minimal typhoon intensity, Dot began regaining organization overwater and continued on a west-northwesterly track. By 201200Z, the Typhoon's intensity peaked at 90 kt (46 m/s) 300 nm (556 km) south-southwest of Hong Kong (WMO 45007). Dot weakened as it churned across the southern tip of Hainan Island, leaving at least two dead, 2300 houses collapsed, and flooding in its wake. Crossing the Gulf of Tonkin in less than a day, it slammed into the coast of North Vietnam 130 nm (241 km) south of Hanoi (WMO 48819). The final warning on Dot was issued at 220000Z as the system dissipated over the rugged mountains inland.

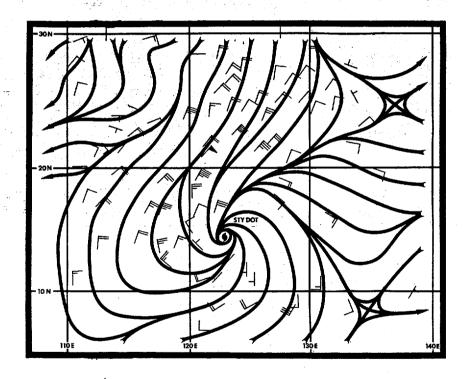


Figure 3-21-6. Surface analysis at 1812007 October showing strong winds extending out a great distance in the northwest semicircle and the absence of (convection-enhanced) low-level southwest monsoon flow.

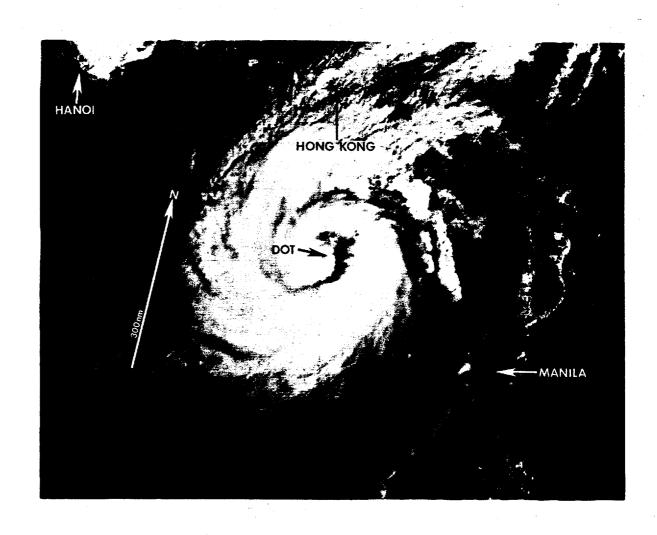
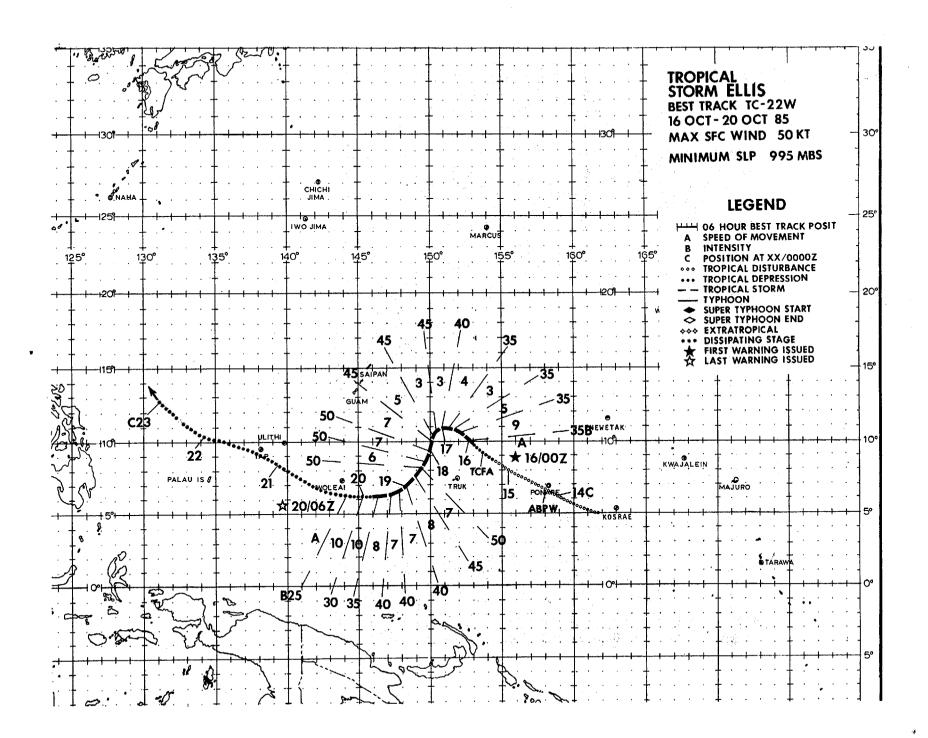


Figure 3-21-7. Super Typhoon Dot with 85 knots (44 m/s) after crossing Luzon and re-intensifying in the South China Sea (2002212 October DMSP visual imagery).



Tropical Storm Ellis, which formed in the wake of Super Typhoon Dot, proved to be a relatively short-lived system. Although it did not pass close enough to any populated areas to cause significant damage, Ellis was noteworthy since it presented a unique forecasting problem. Originally forecast to move west-northwest under the subtropical ridge and pass relatively close to Guam, it actually slowed just after reaching tropical storm intensity and proceeded to move southwest for almost three days before dissipating over water.

The disturbance which eventually developed into Tropical Storm Ellis was first observed as a curved band of convection near the island of Ponape (WMO 91348) on 14 October. The area was subsequently included on the Significant Tropical Weather Advisory (ABPW PGTW) at 140600Z. The system moved west-northwest and increased in organization during the next 36-hours. At 151730Z, a Tropical Cyclone Formation Alert (TCFA) was issued and aircraft reconnaissance requested for the following day.

Interpretation of the 160000Z visual satellite imagery, using the Dvorak intensity technique, yielded a surface wind estimate of 35 kt (18 m/s).

This, in combination with aircraft reconnaissance which located a surface circulation with 35 kt (18 m/s) at the 1500 ft (457 m) level at 160458Z, prompted the first warning on Tropical Storm Ellis at 160500Z. Ellis was forecast to move west-northwest under the subtropical ridge which was apparently well established to the north of the system. At 170000Z Ellis slowed to 3 kt (6 km/hr) as the steering flow south of the subtropical ridge axis weakened in response to the passage of a mid-latitude trough to the north. The forecast philosophy of continuing the west-northwest track was not changed at this point, as a resumption of that movement was expected when the mid-latitude trough moved northeastward. In addition, the synoptic guidance appeared to be in agreement with this reasoning. Figure 3-22-1 is Fleet Numerical Oceanography Center's (FNOC) 700 mb Numerical Variational Analysis (NVA) field for 170000Z, which indicates the weak easterly flow around the subtropical ridge and the mid-latitude trough north of Ellis. The 400 mb analysis for the same time (Figure 3-22-2) indicates similar features, except the north-south extent of the subtropical ridge is much smaller. Note that the flow near Ellis is generally weak and southerly, with weak easterlies to the north.

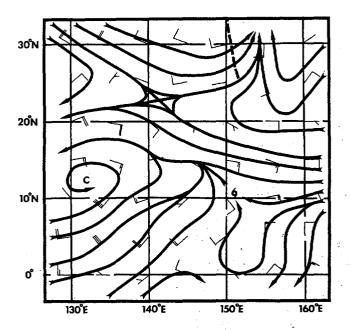


Figure 3-22-1. 170000Z 700 mb Numerical Variational Analyses (NVA) showing weak troughing and 15 kt (8 m/s) easterlies to the north of Ellis.

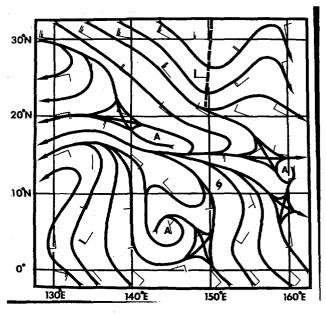


Figure 3-22-2. 170000Z 400 mb NVA depicting weak ridging north of Ellis.

Due to the uncertainity of these mid-tropospheric analyses, synoptic track aircraft missions were requested. The one flown between 0300Z and 0700Z on 17 October provided 400 mb winds in the vicinity of Ellis' forecast track. Figure 3-22-3 shows these observations. In contrast to the NVA analysis (Figure 3-22-2) for that time, the flow is generally northerly to the north and west of Ellis. The lack of data over water in the western North

Pacific was probably responsible for the disagreement between the aircraft observations and the NVA analysis at 400 mb. However, the NVA from the following day (180000Z) represented a significant change; the observations from the synoptic track were in good agreement with the new analysis at 400 mb (see Figure 3-22-4).

In the meantime aircraft reconnaissance at

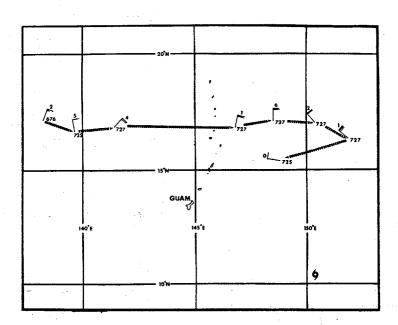


Figure 3-22-3. Observations from the aircraft reconnaissance mission synoptic track at 400 mb, indicating northerly flow vice easterly flow ahead of Ellis.

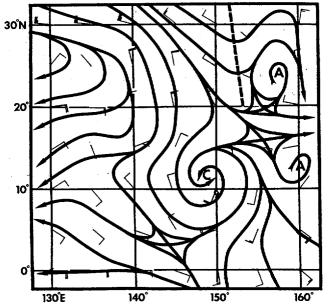


Figure 3-22-4. 1800002 October 400 mb analysis, showing northerly flow ahead of Ellis, which agrees with earlier observations from the synoptic track.

172200Z and 172345Z found the low-level circulation center well south of the forecast track, indicating Ellis had moved south-southwest during the period. At that time Ellis also reached its maximum intensity of 50 kt (26 m/s). The feature that helped to drive the low- to mid-level ridging to the west and moved Ellis to the south-southwest, was most probably an upper cold low, or cell, in the tropical upper-tropospheric trough (TUIT). The 200 mb analysis for 190000Z (see Figure 5-22-5) indicated that the TUIT cell was in close proximity to Ellis. Satellite imagery at that time indicated that upper-level outflow was suppressed in the west semicircle (see Figure 3-22-7). The low- to mid-level flow remained northerly, and Ellis continued its southwestward

track.

At 191200Z, Ellis began to weaken as it attempted to move under the TUTT cell and experienced increased vertical shear. By 200000Z the intensity had decreased to 30 kt (15 m/s) and the low-level cloud lines had lost most of their curvature. The last warning was issued at 200600Z.

In retrospect the One-way Tropical Cyclone Model (OTCM) presented a puzzle during the initial fore-casts on Ellis, because of its previous performance on Super Typhoon Dot several days before. With Dot, which also formed in low latitudes, OTCM guidance repeatedly, and erroneously, drove the system equa-

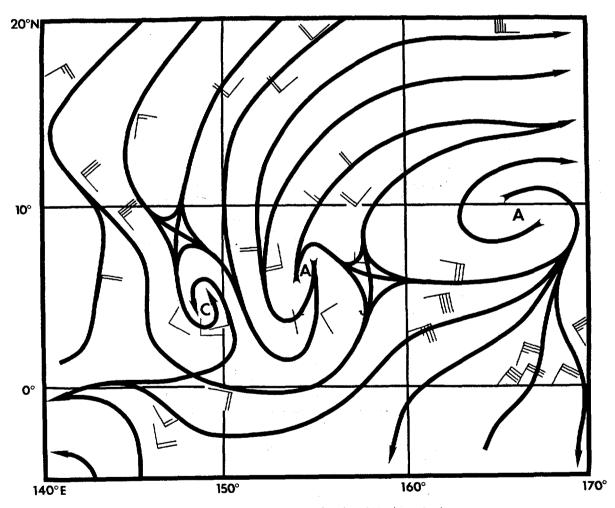


Figure 3-22-5. 1900007 October 200 mb analysis depicting the location of the TUTT and the upper-level cold low.

torward. As a consequence, the OTCM (Figure 3-22-6), which indicated southwest movement for Ellis, was highly suspect. Persistence and climatology favored a west to northwest track through the southern Mariana Islands. As it turned out, Ellis moved southwest, passing well south of the island of Guam. In this case the OTCM guidance was "right" for the "wrong" reasons. After—the—fact it was determined by the software managers at Fleet Numerical Oceanography Center that during this time the Primitive Equation (PE) model was run instead of the Navy Operational

Global Atmospheric Prediction System (NOGAPS). Since the PE model was hemispheric - not global - OTCM, when it received the data fields, only found the northern hemisphere with a boundary at the equator. Thus, for a low latitude systems like Ellis and Dot, OTCM generated a spurious vortex due to the lack of southern hemisphere fields. This caused the forecast guidance to fluctuate wildly and drive the system towards the equator. OTCM, subsequently, was modified to incorporate the latest southern hemisphere fields before running.

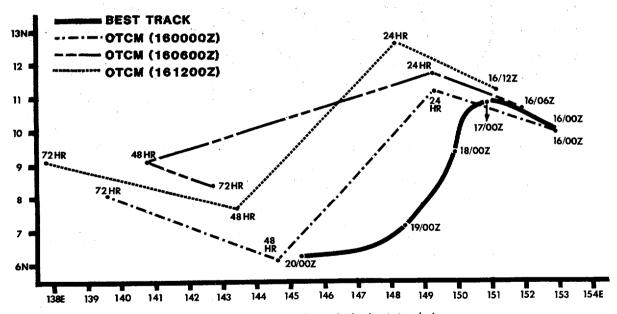


Figure 3-22-6. Comparison of the best track for Ellis with OTCM guidance for the period 1600002 through 1612002 October.

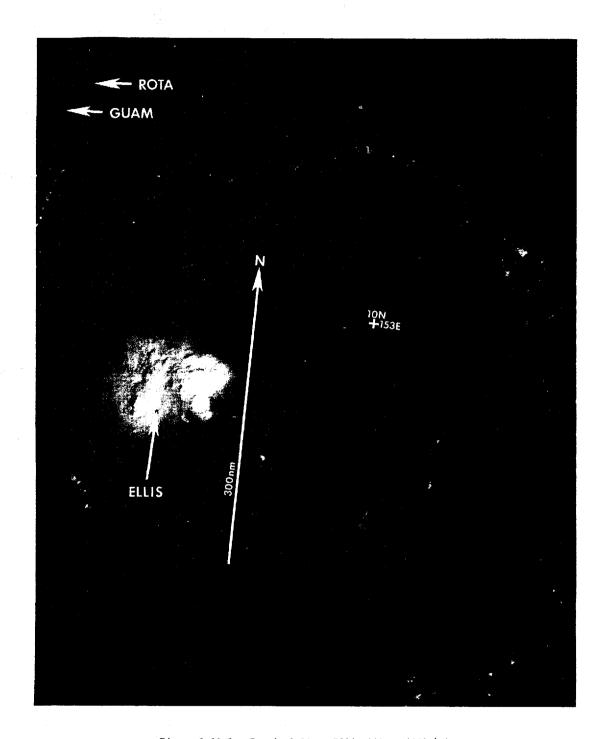


Figure 3-22-7. Tropical Storm Ellis 440 nm [815 km] south-southeast of Guam. Cirrus clouds define the outflow boundary in the eastern semicircle. Although Ellis is near the edge of the satellite imagery, the absence of cirrus in the western semicircle hints at the restricted outflow aloft due to the close proximity of the upper cold low further to the west [1823252 October DMSP visual imagery].

Faye was the last of four tropical cyclones to form in October, a month that normally accounts for five. Its formation was unusual because it was masked by two other tropical cyclones already in progress.

To set the stage, on 21 October Super Typhoon Dot was moving from the South China Sea into North Vietnam. The low-level southwesterly flow, that had been feeding into Dot, extended across the South China Sea into the Philippine Islands. A day later with Dot over land and dissipating - a fresh outbreak of polar air from the northeast moved across the northern South China Sea and Philippines. The lowlevel convergence and cloudiness associated with the southwesterly monsoon flow persisted in the southern Philippine Islands - (this was the start of Faye). To the east in the Philippine Sea the remnants of Ellis were embedded in the western end of the nearequatorial trough. Ellis had been finalled at (200600Z). Although devoid of central cloudiness, it still retained some cyclonic vorticity. As the remnants of Ellis drifted west-northwestward, satellite imagery at 221200Z revealed a resurgence of its central convection. This renewed activity resulted in the issuance of two Tropical Cyclone Formation Alerts (TCFA) at 211200Z and 220300Z. remains of Ellis, however, did not regenerate.

In conjunction with the continued interest in Ellis, an aircraft reconnaissance investigation mission was scheduled for the daylight hours on the 23rd of October. It located east-southeasterly winds at 10 kt (5 m/s) and a MSLP of 1009 mb associated with the TCFA area; however, as the flight continued to the west, it discovered 35 kt (18 m/s) winds and a MSLP of 1004 mb associated with another circulation. This prompted the first warning on Tropical Depression 23W at 230000Z. Up to this time there had been no mention of this new system in either the Significant Tropical Weather Advisory (ABPW PGTW) or the TCFA associated with Ellis. The tropical depression, once identified, moved northwestward under the subtropical ridge and slowly intensified. It reached tropical storm intensity at 231200Z. Later (240300Z), Tropical Storm Faye made landfall over central Luzon 60 nm (111 km) northeast of Manila (WMO 98429) with an intensity of 40 kt (21 m/s). Faye tracked to the northwest across Luzon in 9 hours and entered the South China Sea as a 20 kt (10 m/s) tropical depression some 130 nm (241 km) northnorthwest of Manila. During the next 12-hours, Faye re-intensified over open water and moved on to the northwest. As a consequence of this northwesterly movement, Hong Kong (WMO 45005) went to Tropical Cyclone Condition of Readiness III at 250303Z.

Although, the system was forecast to move slowly to the northwest and intensify, the presence of a mid-latitude trough over mainland China changed that scenario. Faye was upgraded to tropical storm intensity late on the 24th and slowed further. Actually, satellite, radar and two aircraft reconnaissance fixes confirmed that the system completed a small cyclonic loop between 241800z and 251800z. Then Faye turned northeastward and accelerated through the Luzon Straits. Aircraft reconnaissance peripheral data between 262100Z and 270000Z showed the maximum surface winds to be in the northeastern semicircle. This was due to the increased pressure gradient between the low central pressure of Faye and the ridge to the northeast over Japan. For the next two days, after moving from the Straits, Faye slowed again, covering only 140 nm (259 km). The slowing trend was accompanied by intensification. Faye became a typhoon at 281800Z.

With Typhcon Faye approaching, Kadena AB on the island of Okinawa set Tropical Cyclone Condition of Readiness III (at 2909002), and Condition II at 3003102. During this period Typhcon Faye was at its maximum intensity of 100 kt (51 m/s) and beginning to accelerate to the northeast (see Figure 3-23-1). The closest point of approach to Kadena AB was 90 nm (167 km) to the southeast at 3019002. Even though Faye's intensity at this time was 85 kt (44 m/s), the maximum observed winds at Kadena AB were only 18 kt (9 m/s).

After passing south of the island of Okinawa, Typhoon Faye continued to decrease in intensity due to the increased strength of the upper-level west-erlies and the associated vertical wind shear. At 311200Z, 17 hours after its closest point of approach to Okinawa, Typhoon Faye was downgraded to a tropical storm. Faye continued accelerating to the east-northeast and transitioned to an extratropical low with an intensity of 45 kt (23 m/s) six hours before the final warning at 011200Z.

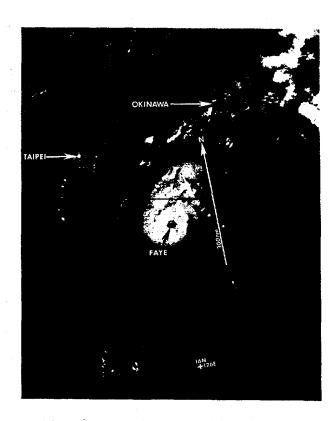


Figure 3-23-1. Nighttime moonlight imagery of Typhoon Faye one day after reaching typhoon intensity. Because this is a law-light-level image, the bright city lights along the west coast of the island of Taiwan can be seen to the west of the Tropical Cyclone [2913462 October DMSP visual imagery].

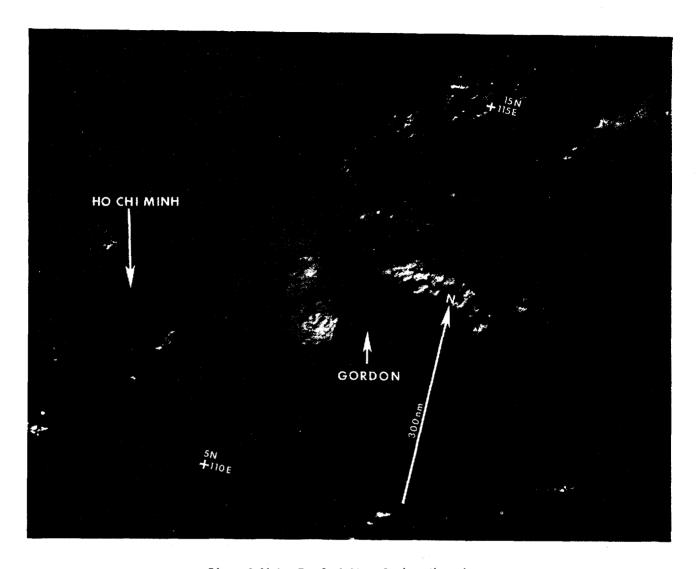


Figure 3-24-1. Tropical Storm Gordon, the only significant tropical cyclone to develop in WESTPAC during November, originated in the monsoon trough in the South China Sea. Gordon's initial intensification to a tropical storm on the 20th was coincident with a surge in the northeast monsoon which was present from late on the 19th until early on the 21st. However, by 2200007 the surge had weakened and so did Gordon. Subsequent redevelopment to tropical storm intensity on the 23rd and 24th appeared to be due to the system's development as a warm-core tropical cyclone. The USS Kitty Hawk (CV-63) Battle Group passed close to Gordon's center on the 23rd without sustaining any damage, and reported winds of 35-45 kt (18-23 m/s). Positioning the center of Tropical Storm Gordon was often difficult, particularly at night. The low-level circulation center was often sevenal degrees away from the strongest convection, and although frequently exposed, consisted of only low-level cloudiness, which was difficult to resolve on infrared satellite imagery. The most intense convection was usually observed northwest of the low-level circulation center, as shown in the (above) imagery (2302287 November DMSP visual imagery).

Hope was a late-season typhoon that originated at low-latitude in the near-equatorial trough. It was aided in its initial development by the presence of enhanced low-level northeast monsoon flow and an associated shear zone. Typhoon Hope presented forecast problems at two different times: first at the crucial turning point from a westward to a northward track; and after recurvature when extratropical transition was imminent.

After Tropical Storm Gordon dissipated over Vietnam on the 25th of November, a winter weather pattern dominated the northwest Pacific area. Convective activity was confined to low latitudes in the near-equatorial trough. The disturbance, that was to become Typhoon Hope, was detected on the 13th of December between Truk and Pohnpei. The disturbance moved in a general westerly direction for the next three days and showed signs of slow intensification. Figure 3-25-1 shows Hope as a tropical depression located approximately 90 nm (167 km) east of Yap. By 171800Z, satellite data indicated the disturbance had further intensified while moving west-northwestward

aided by the effect of the shear zone to the north. As a result, the initial warning was issued. Between 171800Z and 191200Z December, Hope moved northwest before coming under the full steering influence of the mid-level subtropical ridge that caused the system to assume a westward track.

Tracking Hope during the period 191200Z-201200Z was facilitated by the availability of four aircraft fixes and several satellite eye fixes. Typhoon Hope reached its maximum intensity of 100 kt (52 m/s) at 200600Z (see Figure 3-25-2) just thirty hours after the initial warning. After that, Hope decreased slightly in intensity and maintained 65-75 kt (34-39 m/s) during the period 210600Z-231200Z.

After the 200300Z warning, the One-way Interactive Tropical Cyclone Model (OTCM) showed definite indications of a recurvature type track, whereas before it had indicated a generally north-westward track. The OTCM is the primary forecasting aid. The Nested Tropical Cyclone Model (MTCM) did not show signs of recurvature, but did indicate a

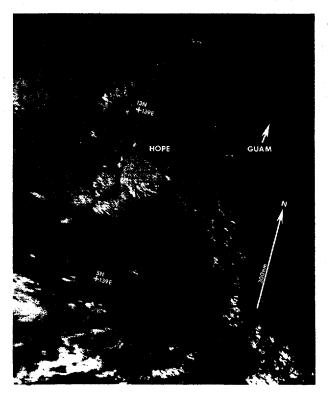


Figure 3-25-1. Hope as a tropical depression approximately 90 nm (167 km) east of Yap (WMO 91413). The shear zone to the north apparently aided Hope's development by enhancing the low-level northeast flow (1704417 December NOAA visual imagery).



Figure 3-25-2. Typhoon Hope with a large ragged eye near time of maximum intensity (2005512 December NOAA visual imagery).

northerly track. As indicated in Figure 3-25-3, the OTCM yielded good forecast guidance during the period 191800Z-201200Z and the NTCM (Figure 3-25-4) gave fairly good guidance during the period 191800Z-210000Z. OTCM indicated a northwestward track and recurvature to the north-northeast (Figure 3-25-3) after about 48 hours. NTCM indicated a track change from northwest to northward (Figure 3-25-4). This guidance was integrated into the 201500Z warning. The track made good synoptic sense since it could be interpreted as Typhoon Hope moving around the western periphery of the mid-level subtropical ridge. The forecasts held with a curving track that started toward the west-northwest, turned north, and became northeast at about the 48 hour point.

After 201200Z December, a sequence of events started that caused major track forecast problems. As has been pointed out earlier, after 201200Z Typhoon Hope began to weaken slightly and the eye structure disappeared from satellite imagery. This resulted in doubts about the exact location of the

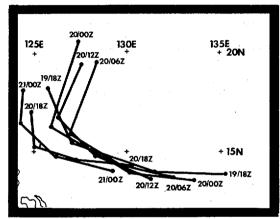


Figure 3-25-3. One-way interactive Tropical Cyclone Model (OTCM) forecast tracks for the period 191800Z-210000Z December showing a recurvature track.

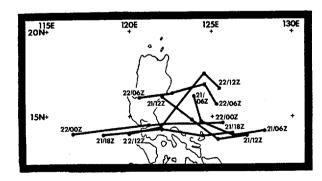


Figure 3-25-5. One-way interactive Tropical Cyclone Model (OTCM) forecast tracks for the period 210600Z-221200Z December. The forecast guidance indicates that the recurvature track is changed to westerly with time.

surface center of the typhoon. At 210842Z, a 31 hour period began during which no aircraft fixes were made on Typhoon Hope due to aircraft non-availability and maintenance problems. Under normal conditions, four aircraft fixes would have been made during that time period. Aircraft positioning of typhoons is the most accurate method available and is especially important at major track changes.

After 210000Z, the OTCM guidance stopped the recurvature scenario and started showing just a general northwest movement (Figure 3-25-5). It indicated a more westward direction with each run of the model. NTCM also indicated a northward track until 210000Z. After that time, it went to a straight westward track (Figure 3-25-6). This erroneous guidance (ie. the westward track) reflected OTCM and NTCM's inability to forecast in a winter synoptic situation. With specific reference to the model, strong middle-to-upper level westerlies apparently caused an early termination of the model run, or (as in this case) misleading guidance.

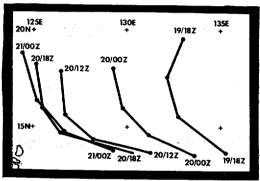
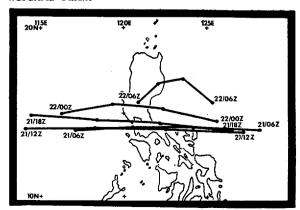


Figure 3-25-4. Nested Tropical Cyclone Model (NTCM) forecast tracks for the period 191800Z-210000Z December showing fairly good forecast track guidance in the form of tracks with northward movement.

Figure 3-25-6. Nested Tropical Cyclone Model (NTCM) forecast guidance for the period 210600Z-220600Z December showing the swing to an almost straight westward track.



The final factor leading up to the forecast problem was Hope's continued west-northwestward movement and decreasing distance from Luzon. There was a definite need to warn of Hope's approach if there was a possibility that it was going to continue moving west-northwest and not recurve.

The combination of these events presented a dilemma for the typhoon forecaster, who had to issue the 220300Z warning. Hope was close to the critical track turning point. It was either going to continue moving west-northwest and make landfall on the east coast of Luzon, or start moving northward and recurve as had been forecast for the past 36 hours. The forecaster was presented with the following facts: (1) Hope's position was known within an estimated accuracy of 60 nm (111 km) based on poorly defined infrared satellite fixes (no satellite eye fixes or aircraft fixes being available); (2) Hope appeared to be continuing on a west-northwest track; (3) the numerical forecast models were indicating a straight westward track and had not indicated recurvature for about 24 hours; and (4) there was a definite need to warn Department of Defense interests on Luzon of Hope's approach. After carefully considering the combined effect of these factors, the forecaster decided to significantly change the forecast philosophy and forecast Typhoon Hope to track west-northwest across Luzon into the South China Sea.

During the next six hours; however, satellite fixes indicated that Typhoon Hope was moving toward

20/NU 20/NU

Figure 3-25-7. 400 mb Numerical Variational Analysis (NVA) at 220000Z December indicates a trough extends from near 60N 130E to 22N 107E with moderate westerlies north of Hope.

the north. A quick recovery was made on the 2209002 warning when the forecast track was switched back to one reflecting northward movement, followed by recurvature to the northeast, and decreasing intensity as extratropical transition occurred. The warnings over the next two days were accurate with a general concept of eastward movement with extratropical transition. The forecast tracks had Hope accelerating in speed and moving as far east-northeast as 27N 149E before completing extratropical transition.

In retrospect, an extratropical transition where the tropical cyclone is sheared away by upper-level westerlies and then dissipates below 20N would have been a more representative forecast for the final two days. Climatologically, this is what one would expect to happen in late December. In the case of Typhoon Hope, the 400mb trough with moderate westerlies over southern China was super-imposed over moderate-to-strong anticyclonic flow and cold air advection at the 925 mb level. These features are depicted in Figures 3-25-7 and 3-25-8. Based on these patterns, a shearing type of extratropical transition (followed by a dramatic decrease in the system's associated wind speeds) with no significant eastward acceleration is to be expected. Shearing, decreased wind speeds, and no significant eastward acceleration is exactly what happened after 240000Z. Figure 3-25-9 shows the remnants of Hope. There were no reported deaths, injuries, or property damage attributed to this late-season typhoon.

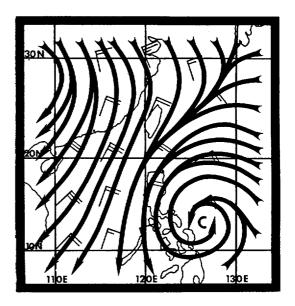


Figure 3-25-8. 925 mb NVA analysis at 2200007 showing moderate-to-strong anticyclonic flow and cold air advection over southern China.

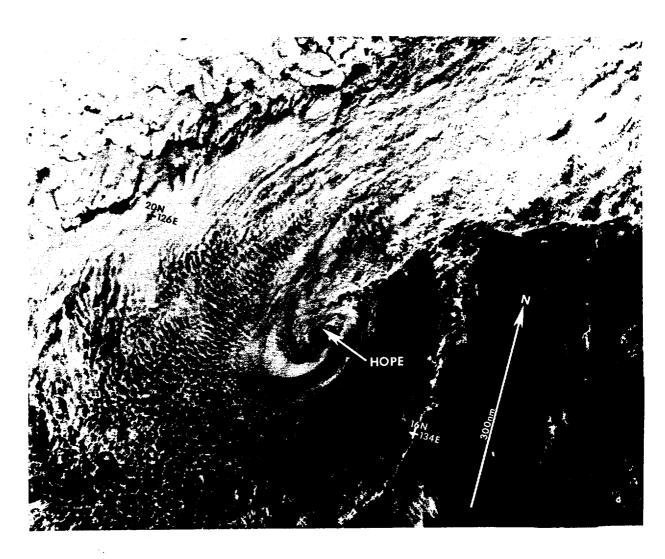


Figure 3-25-9. Typhoon Hope dissipating after having the central convection sheared away by mid-to-upper level westerlies (240042Z December DMSP visual imagery).

116

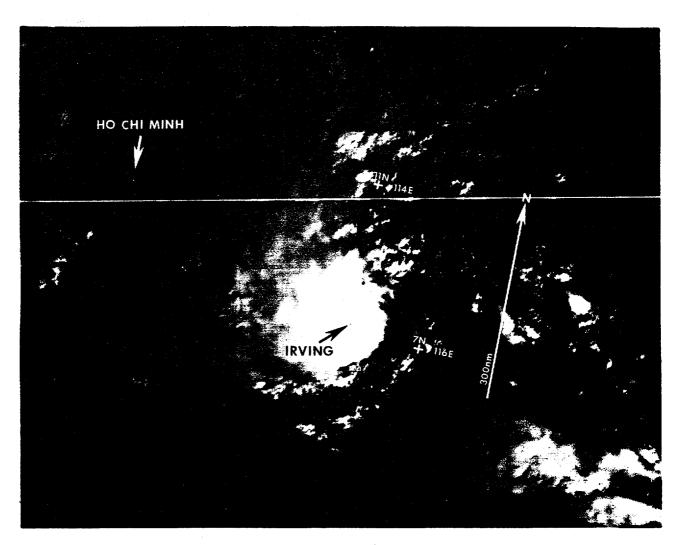


Figure 3-26-1. Tropical Storm Irving was one of two significant tropical cyclones to occur in the month of December. It formed at the western end of the low-latitude near-equatorial trough. The proximity of the low-level northeast monsoon and associated winter gales in the South China Sea masked Irving's initial development. Airchaft reconnaissance proved instrumental in locating the low-level circulation center and describing the wind field of this off-season tropical cyclone. Irving's central dense overcast and low-level cumulus spirals are visible in the (above) satellite imagery (1902242 December DMSP visual imagery).

3. NORTH INDIAN OCEAN TROPICAL CYCLONES

Tropical cyclone activity in the North Indian Ocean was above normal. Six significant tropical cyclones, all of tropical storm intensity, developed as compared to the climatological mean of four. These systems occurred in the spring and fall trans-

ition season, which normally encompasses the peak of the activity. Tables 3-6 through 3-8 provide a summary of information for 1985 and comparison with earlier years.

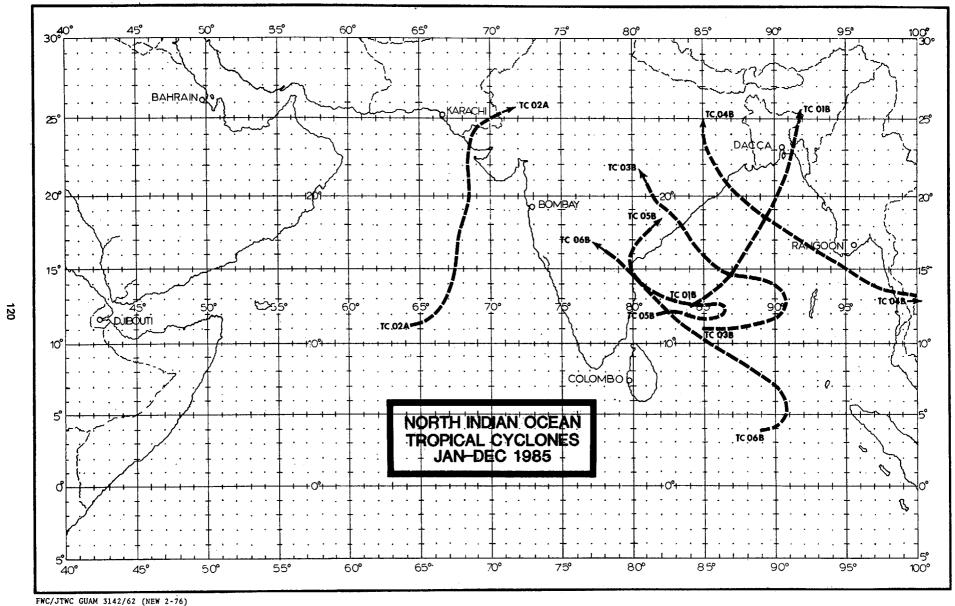
7	TABLE 3	J-6.						
	1985 SI	GNIFICANT	TROPICAL CYCLONES					
3	TROPICA	L CYCLONE	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	NUMBER OF WARNINGS ISSUED	MAXIMUM SURFACE WIND KT - (M/S)	ESTIMATED MSLP MB	BEST TRACK DISTANCE TRAVELED NM - (KM)
ı	TC	01B	23MAY - 25MAY	3	. 8	60 (31)	979	515 (954) [.]
1	TC	02A	29 MAY - 31 MAY	3	12	50 (26)	987	609 (1128)
	TC	. 03B	90CT - 110CT	3	7	50 (26)	988	667 (1235)
	TC	04B	150CT - 160CT	2	4	50 (26)	987	296 (548)
ı	TC	05B	15NOV - 18NOV	4	12	55 (28)	983	843 (1561)
	TC	06B	11DEC - 14DEC	4	11	50 (26)	987	1025 (1898)
1			1985 TOTALS:	19	54			•

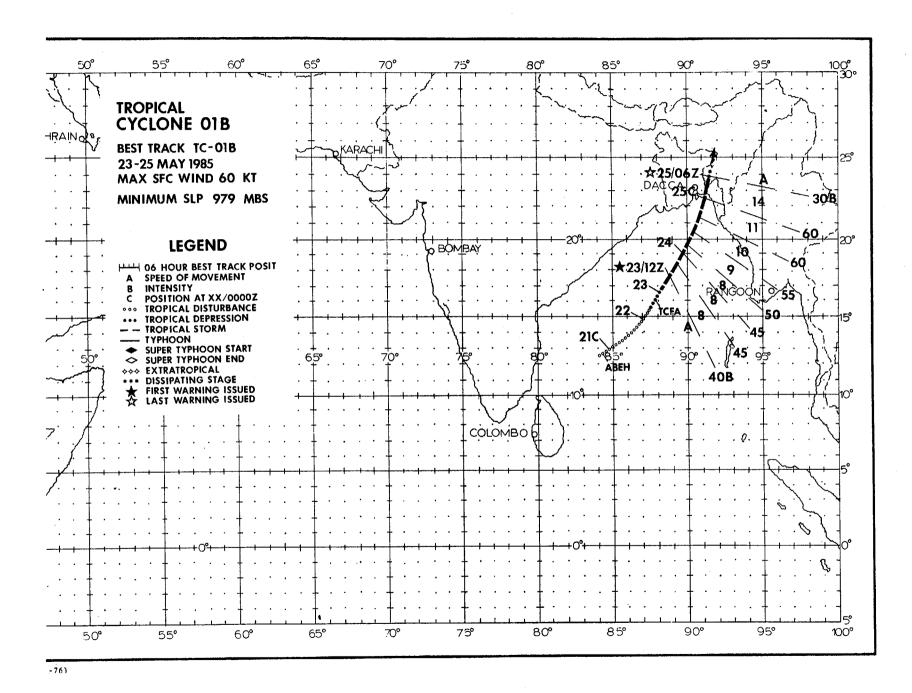
TABLE 3-7.													
	1985 SIGNIFICANT TROPICAL CYCLONES												
NORTH INDIAN OCEAN													
INDIAN OCEAN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1985 TROPICAL CYCLONES	0	0	0	0	2	0	0	0	0	2	1	1	6
1975 - 1985 AVERAGE	.1	-	-	.1	.8	. 4	-	.1	. 3	1.1	1.4	. 4	4.5
CASES	1	-	-	1	9	4	-	1	3	12	15	4	50
													:
FORMATION ALERT:	5 out of 8 Formation Alerts developed into significant tropical cyclones. Tropical Cyclone Formation Alerts were issued for all significant tropical cyclones, except one, that developed during 1985.												
WARNINGS Number of warning days: 19									,				
	Number of warning days with two tropical cyclones in region:							0					
	Number of warning days with three or more tropical cyclones in region:						n :	0					

TABI	Æ 3	3 8	В.
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YEAR	<u>JAN</u>	FEB	MAR	<u>APR</u>	MAY	JUN	<u>JUL</u>	AUG	SEP	OCT	NOV	DEC	TOTAL
1971*	_	-	_	_	_	0	0	0	0	1	1	0	2
1972*	0	0	0	1	0	0	0	0	2	0	1	0	4
1973*	0	0	0	0	0	0	0	0	0	1	2	1	4
1974*	0	0	0	0	0	0	0	0	0	0	1	0	1
1975	1	0	0	0	2	0	0	0	0	1	2		6
1976	0	0	0	1	0	1	0	0	1	1	ō	ì	Š
1977	0	0	0	0	1	1	Ō	0	0	1	2	ō	Š
1978	0	0	0	0	1	0	0	0	0	1	2	Ō	4
1979	Ó	0	0	0	1	1	0	0	2	1	2	Ď	7
1980	0	0	0	0	0	0	0	Ö	0	ō	1	ĭ	ż
1981	0	0	Ó	0	Ō	Ö	0	Ö	Ō	1	ī	ī	3
1982	0	0	0	0	1	1	0	0	Ō	2	1	ō	5
1983	Ō	0	0	0	0	0	Ō	1	Ŏ	ī	ī	ŏ	3
1984	0	0	0	0	1	0	0	0	Ô	ī	2	ō	4
] 985	0	0	0	0	2	0	0	0	0	2	1	1	6
1975-1985 AVERAGE	.1	-	-	.1	.8	. 4	-	.1	. 3	1.1	1.4	. 4	4.5
CASES	1	. 0	0	1	9	4	0	1	3	12	. 15	4	50

^{*} JTWC warning responsibility began on 4 June 1971 for the Bay of Bengal, east of 90E. As directed by USCINCPAC, JTWC issued warnings only for those tropical cyclones that developed or tracked through that portion of the Bay of Bengal. Commencing with the 1975 tropical cyclone season JTWC's area of responsibility was extended westward to include the western portion of the Bay of Bengal and the entire Arabian Sea.





TROPICAL CYCLONE 01B

Tropical Cyclone 01B was the first of two cyclones to form in the North Indian Ocean during the Spring transition season. Although only reaching an intensity of 60 kt (31 m/s), it was one of the most noteworthy storms of 1985 due to the tremendous loss of life the cyclone caused in Bangladesh. An estimated 6,000 people died from the storm, with an additional 300,000 people left homeless. Most of the deaths were due to the storm surge, estimated at 15 ft (5 m), which completely inundated many of the low-lying islands (DeAngelis, 1985).

By late May, the Spring transition season was well underway in the North Indian Ocean. The southwest monsoon had moved into the southern Bay of Bengal and was creating a large amount of convection across the region. Late on the 20th of May, an area of convection began to show some organization in the southwest Bay of Bengal. This prompted the Signifi-

cant Tropical Weather Advisory (ABEH PGTW) to be reissued at 202030Z to include mention of this disturbance. During the following nine hours satellite imagery showed the disturbance continuing to improve in organization. As a result, the potential for significant tropical cyclone development was upgraded to "fair" on the 210600Z Significant Tropical Weather Advisory. Subsequent data continued to show slow development. An upper-level anticyclone was forming over the disturbance and a Dvorak analysis of satellite imagery estimated surface winds of 25 to 35 kt (13 to 18 m/s). This resulted in the issuance of a TCFA at 222100Z as the disturbance moved into the central Bay of Bengal.

Since the disturbance was developing in the monsoon trough (Figure 3-01B-1), there was some uncertainty as to whether a closed surface circu-

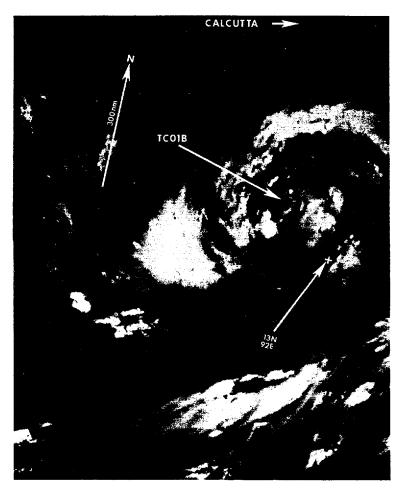


Figure 3-01B-1. The tropical disturbance, which became Tropical Cyclone 01B is consolidating in the Bay of Bengal. Estimated surface winds at this time are 25 kt [13 m/s] (2204322 May DMSP visual imagery).

lation existed or the disturbance was still a broad trough. Analysis performed by the Air Force Global Weather Center (AFGWC) on satellite imagery at 230442Z quickly settled the question by estimating surface winds of 45 kt (23 m/s), which supported a closed surface circulation. Based on this information, the first warning on Tropical Cyclone 01B was issued at 231200Z.

The forecast reasoning for Tropical Cyclone 01B centered on the presence of the monsoon trough. The initial forecast called for the storm to remain in the trough and move to the north-northeast. This forecast philosophy proved to be correct, and remained unchanged throughout the lifetime of Tropical Cyclone OlB. As a result, Bangladesh received nearly a 36 hour warning of the cyclones arrival. The only forecasting difficulty with Tropical Cyclone 01B was predicting its speed. Based on satellite fixes of the poorly defined circulation center from nighttime infrared imagery, the first three warnings indicated a slower forward speed than was actually taking place. This was corrected early on the 24th, when visual satellite imagery revealed the location of the low-level circulation center (Figure 3-01B-2).

Tropical Cyclone 01B continued to intensify, reaching a peak intensity of 60 kt (31 m/s) at 241800Z. This intensity was maintained until land-

fall at 250200Z just west of Chittagong, Bangladesh (WMO 41977). The cyclone lost organization fairly rapidly as it moved inland, but still brought torrential rains and extensive flooding to the higher elevations of Bangladesh and eastern India. The final warning was issued at 250600Z.

The fact that Bangladesh was given advance warning of the cyclones approach was responsible for the saving of thousands of lives. Tropical Cyclone OlB inflicted the greatest damage and death in the delta region of the Ganges. Several low-lying islands were completely submerged due to the 15 ft (5 m) storm surge which accompanied the storm at landfall. In several cases the only structures left standing were concrete multi-story shelters built after the 1970 cyclone (In November 1970, a tropical cyclone hit Bangladesh and killed an estimated 300,000 people). The islands of Sandwip, Urir Char and Bhola were among the most heavily damaged. Further inland, heavy rains caused severe flooding along Bangladesh's northeastern border with India. Overflowing rivers affected tens of thousands of people, with the Tripura and Manipur States of India being among the hardest hit regions.

Reference: DeAngelis, Dick, 1985: Under the Bangladesh Cyclone. Mariners Weather Log, Vol 29, No. 3, pp. 141-143.

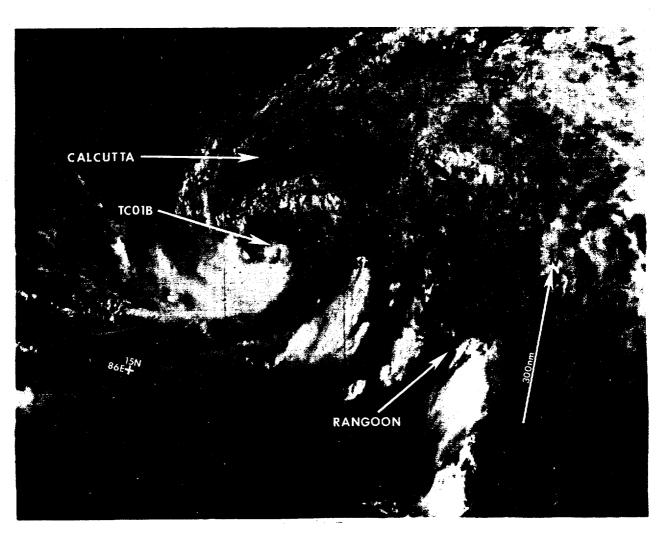
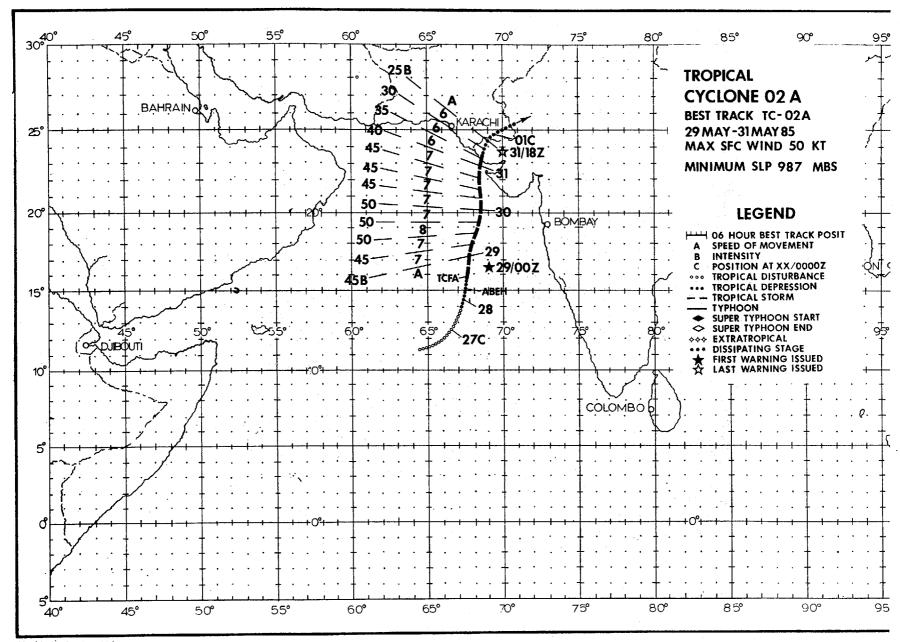


Figure 3-01B-2. Tropical Cyclone 01B less than one day prior to making landfall over Bangladesh (240351Z May DMSP Visual Imagery).



FWC/JTWC GUAM 3142/62. (NEW 2-76)

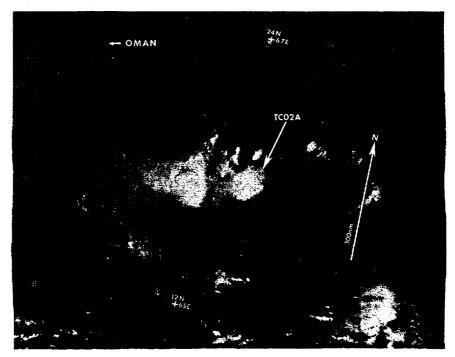


Figure 3-02A-1. Tropical Cyclone 02A near peak intensity. The low-level circulation center is just at the edge of the central cloud mass (2905332 May DMSP visual imagery).

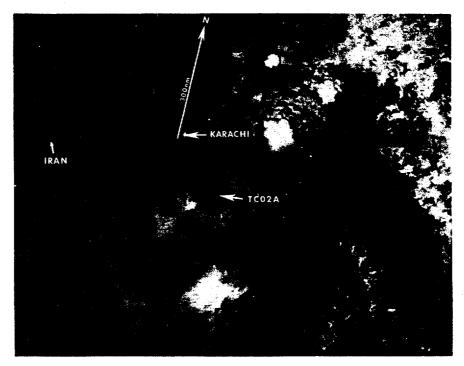
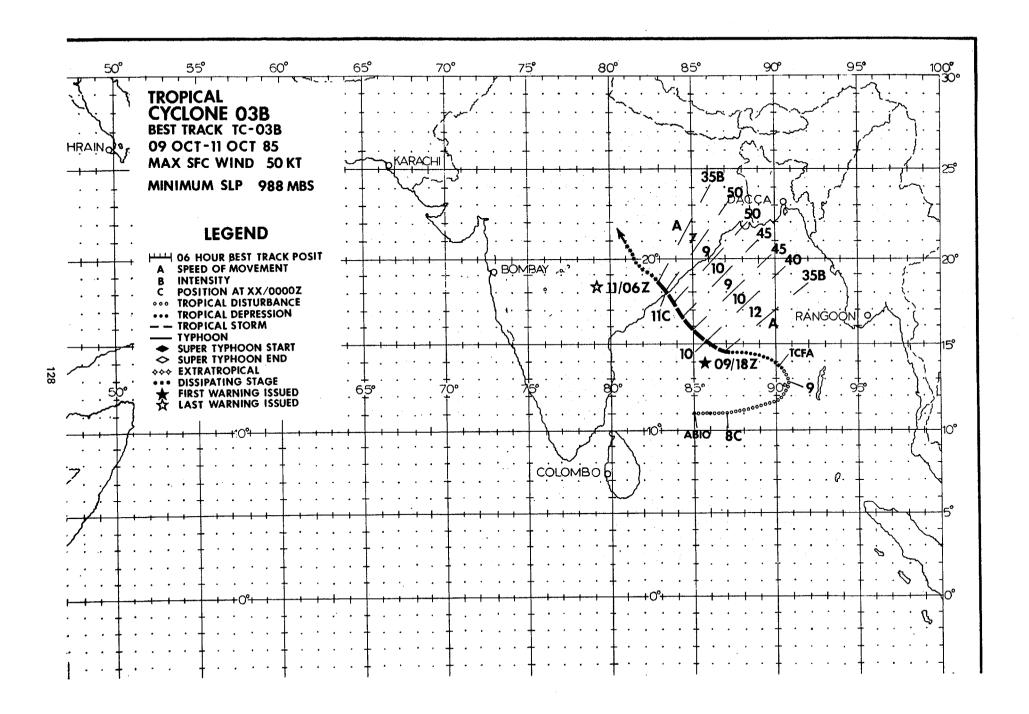


Figure 3-02A-2. Nighttime moonlight image of 02A weakening off the west coast of India. The low-level circulation center is completely exposed (301753Z May DMSP visual imagery).



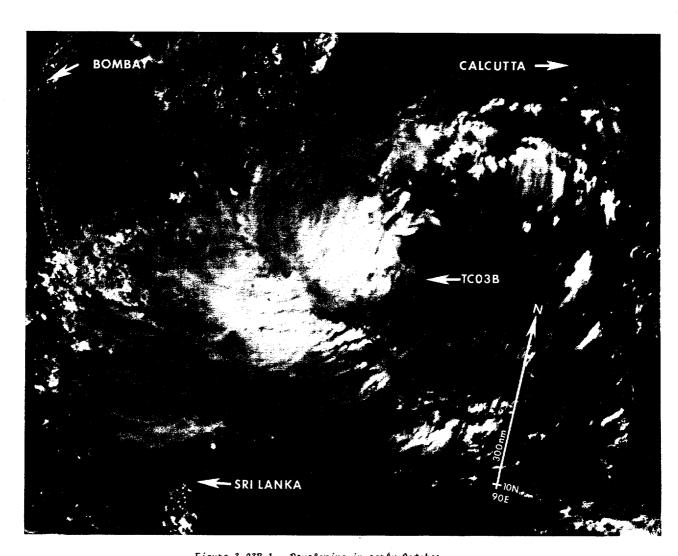
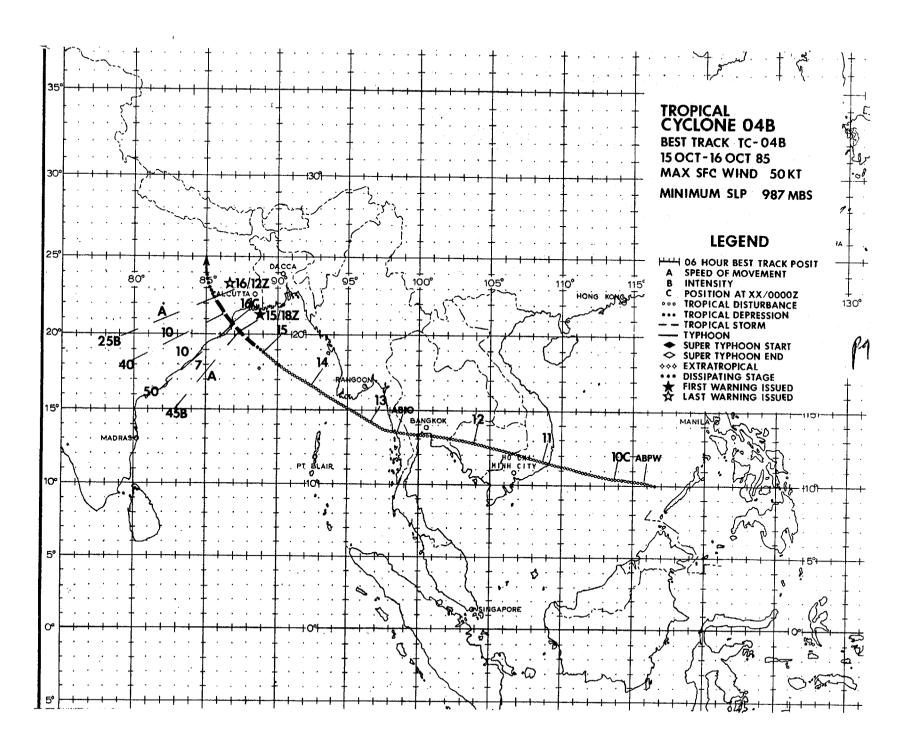


Figure 3-03B-1. Developing in early October, Tropical Cyclone 03B was the first of four tropical cyclones to develop during the Fall transition season. After an initial movement to the east during its formative stage, Tropical Cyclone 03B turned and followed a climatological track to the northwest. The Tropical Cyclone reached a maximum intensity of 50 kt (26 m/s) just prior to making landfall near Visakhapatnam, India (WMO 43149) at 1022002. There were no reports of damage or injuries from this cyclone. The (above) imagery shows Tropical Cyclone 03B as it consolidated in the Bay of Bengal. At this time the intensity was 40 kt (21 m/s) (1004092 October DMSP visual imagery).



Despite being in warning status for only 18 hours, Tropical Cyclone 04B had a long life. It was first detected on 9 October, almost a week before the initial warning was issued, as an area of poorly organized convection in the South China Sea. The Tropical Disturbance was developing in the active monsoon trough, midway between Tropical Cyclone 03B in the Bay of Bengal, and a disturbance in the Philippine Sea that would soon develop into Typhoon Cecil.

Satellite fixes of an upper-level circulation center, based on the extrapolation of cirrus and convective curvature, followed the progress of the system as it moved closer to Vietnam. For the next two days, the system continued to move west-north-westward across the Southeast Asian Peninsula. It emerged in the Andaman Sea late on the 12th, still a poorly organized area of convection. The disturbances westward progress was also reflected at the surface, where a 10 to 15 kt (5 to 8 m/s), 1004 mb low pressure center was present.

During the 13th and 14th, the disturbance turned to the northwest, crossed the northern Andaman Sea and entered the Bay of Bengal. Upper-level support remained relatively weak and diffuse. Positioning by satellite imagery, hampered by mid- to high-level cloudiness, was accomplished on these two days mostly by analysis of spiral band curvature and extrapolation of a poorly defined low-level circulation center. With conditions favorable for slow intensification, the minimum sea-level pressure dropped from 1004 mb on the 12th to an estimated 1000 mb late on the 14th. Surface winds showed a corresponding rise, increasing to 25 kt (13 m/s). Early forecasts on the 14th predicted the system would cross the North Orissa-West Bengal Coast late on the 15th.

Early on the 15th, available data showed little change. Synoptic data at 150000Z showed a 30 kt (15 m/s) surface circulation in the north central Bay of Bengal with an upper-level anticyclone located approximately 80 nm (148 km) to the northeast. Since earlier positions had indicated greater separation between the upper- and lower-level systems, this may have signaled the beginning of increased organization. Still, available synoptic data showed no further decrease in pressure nor significant increase in surface winds. On satellite imagery, the system remained broad and diffuse, showing little improvement in organization over the past 24- to 48-hours (Figure 3-31-1). Meanwhile, coastal Bangladesh, with fresh memories of Tropical Cyclone OlB, which killed

over 6,000 people in May, braced for the current cyclone still expected to hit the coast late on the 15th. Port cities like Chittagong (WMO 41978), Khulna (WMO 41930) and others were advised to raise cautionary signals and fishing boats were advised to stay near the coast.

As 151200Z data became available, it was obvious that the system had, indeed, developed over the past 6- to 12-hours. Synoptic data from ships located a rapidly developing cyclone about 180 nm (333 km) s outh of Calcutta (WMO 42809). Minimum sea-level pressure was estimated to be near 990 mb and winds had increased to 45 kt (23 m/s). At 151555Z, an abbreviated Tropical Cyclone Warning Bulletin was issued by JTWC to reflect the latest data which indicated a cyclone had formed. By then, more port cities had hoisted warning signals, low-lying areas were preparing for a possible storm surge of 4 to 7 ft (1 to 2 m) above sea-level, and more fishing boats and trawlers had sought shelter.

At 151800Z, JTWC issued the first complete warning on Tropical Cyclone 04B. Subsequent ship reports had indicated a continued fall in the mean sea-level pressure and confirmed surface winds of 45 kt (23 m/s). Satellite imagery at 151649Z showed a dramatic increase in organization and convection over the past 12-hours. The strongest convection was already onshore, but the low-level circulation center remained offshore and was located on the northeast edge of the strong convection.

By 160000Z, Tropical Cyclone 04B had reached maximum intensity as it made landfall on the coast of India approximately 55 nm (102 km) south of Balasore (WMO 42895) and about 140 nm (259 km) southwest of Calcutta. A large area of strong convection remained associated with the system (Figure 3-04B-2). However, shearing conditions had already begun to disrupt vertical organization and, as the system continued to track inland, more and more convection and organization were lost. The final warning was issued at 161200Z.

At least 38 people were killed, with over 200 reported still missing as late as six days after the storm struck the coast. Most of the missing were from the east Indian state of Orissa where a village was completely washed away by flood waters. Heavy rain-induced flooding combined with storm-induced high tides to swamp offshore islands cutting-off access to more than 500 villages.

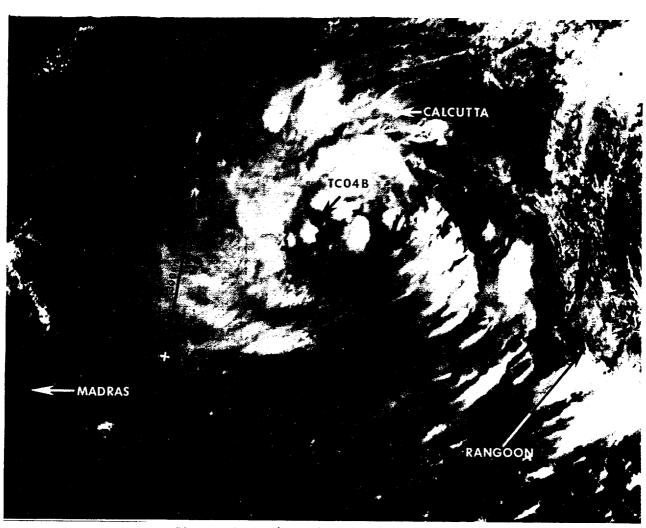


Figure 3-04B-1. The Tropical Disturbance in the Bay of Bengal just prior to undergoing rapid development. The Dvorak intensity estimate is 25 kt [13 m/s] (1504082 October DMSP visual imagery).

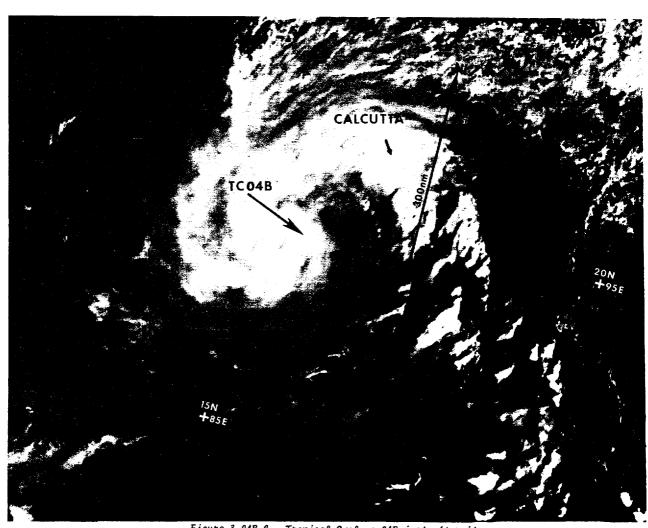
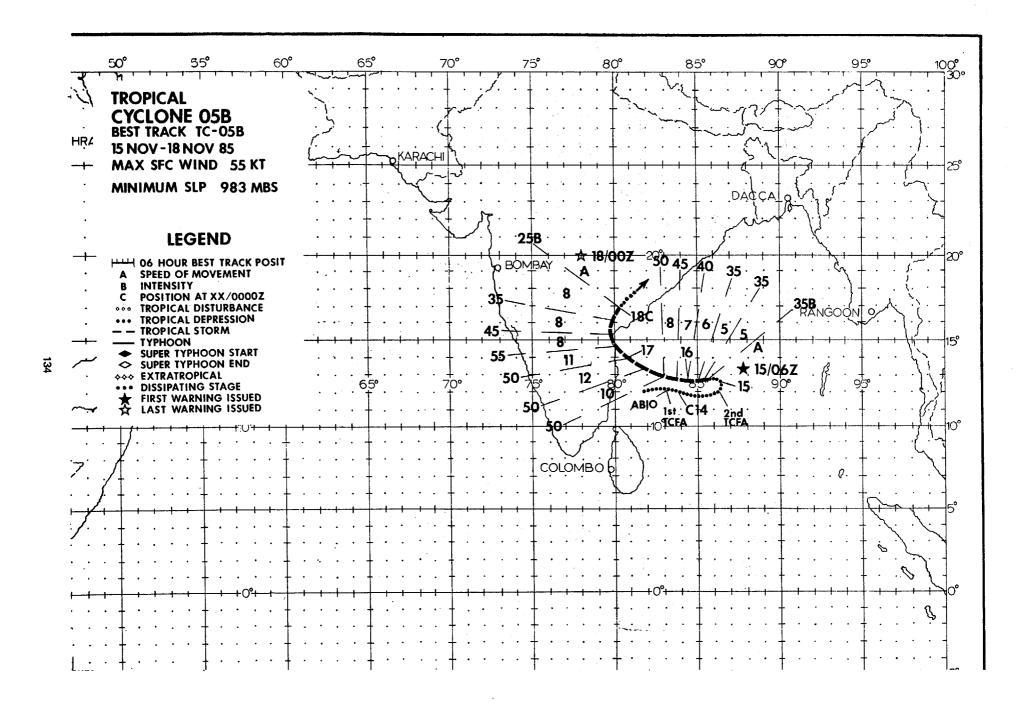


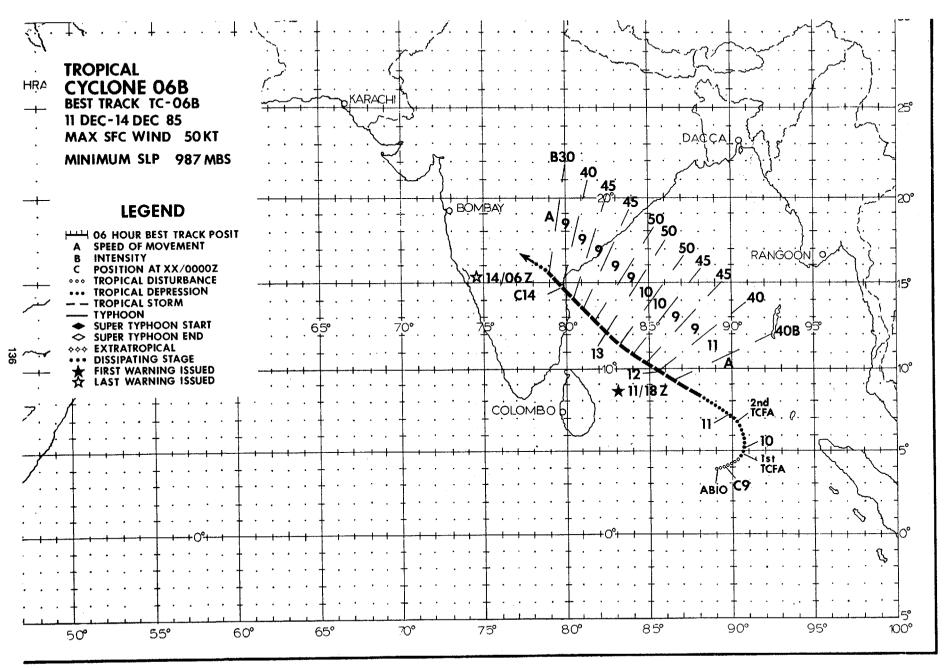
Figure 3-04B-2. Tropical Cyclone 04B just after it made landfall over eastern India. There is a dramatic increase in organization as compared to the imagery in Figure 3-31-1 (160348Z October DMSP visual imagery).



TROPICAL CYCLONE 05B

Tropical Cyclone 05B formed as a monsoon depression on the southern periphery of the monsoon trough approximately 120 nm (222 km) east-southeast of Madras, India. The system was initially thought to be associated with a disturbance that formed on the east Indian coast near Madras. However, postanalysis of satellite fixes and imagery indicate that the first disturbance formed near the western extent of the monsoon trough on 111200Z, then went ashore on about 120600Z. Therefore, it was determined that the first system was not part of the disturbance that eventually became Tropical Cyclone 05B. At 130600Z, A small area of convection on the southern extent of the monsoon trough developed into a cyclone of about 25 kt (13 m/s). A TCFA was issued at 131800Z as the system remained at 25 kt (13 m/s) and moved east along the southern periphery of the monsoon trough. A second TCFA was issued at 141800Z as the cyclone remained at the same intensity and continued to move east at about 9 kt (5 m/s). Tropical Cyclone 05B finally began to intensify slightly when it reached the eastern extent of the monsoon trough at about 150000Z. Subsequently, the system slowed to about 6 kt (3 m/s), began to move north, and intensified to 35 kts (18 m/s), prompting the issuance of the first warning at 150600Z.

At 151200Z, it was apparent that Tropical Cyclone 05B had begun to move west toward India under the influence of low- to mid-level easterlies to the north of the monsoon trough. At this point, The system continued to intensify slowly and began to accelerate, turning to the west-northwest. Tropical Cyclone 05B reached a maximum intensity of 55 kt (28 m/s) just prior to landfall at 170600Z, 90 nm (167 km) north of Madras. No reports of damage or loss of life due to Tropical Cyclone 05B were received.



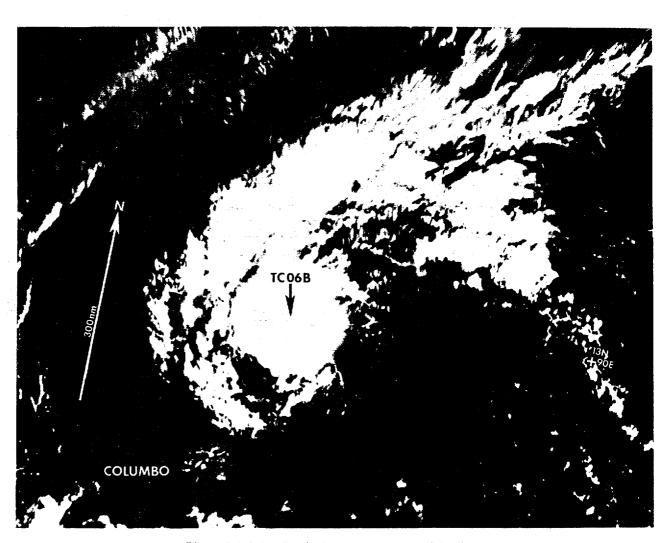


Figure 3-06B-1. Tropical Cyclone 06B formed in the monsoon trough, intensified, and moved northwestward across the Bay of Bengal. In the satellite image, the low-level cumulus lines that are spiralling into the circulation center can be seen along the southern edge of the central dense overcast [1304267 December DMSP visual imagery].

CHAPTER IV - Summary of South Pacific and South Indian Ocean Tropical Cyclones

1. GENERAL

This is the first year that Southern Hemisphere tropical cyclones are included in the Annual Tropical Cyclone Report. In retrospect, the JTWC area of responsibility (AOR) was expanded on 1 October 1980 to include the Southern Hemisphere from 180 degrees longitude westward to the east coast of Africa. Details on tropical cyclones in this region for the July 1980 to June 1982 are contained in Diercks et al, (1982). For the July 1982 through June 1984 period, reference the NOCC/JTWC TECH NOTE 86-1. As in earlier reports, data on tropical cylones forming in, or moving into, the South Pacific Ocean east of 180 degrees, which is the Naval Western Oceanography Center (NAVWESTOCEANCEN) AOR, are included for completeness.

JTMC provides the sequential numbering for all South Pacific and South Indian Ocean significant tropical cyclones. The current convention (as stated in USCINCPACINST 3140.1 (series)) for labelling tropical cyclones that develop in the South Indian Ocean (west of 135 degrees east longitude) is to add the suffix "S" to the assigned tropical cyclone number, while those originating in the South Pacific Ocean (east of 135 degrees east longitude) receive a "P" suffix. The "P" suffix also applies to significant tropical cyclones which form east of the 180 degrees in the South Pacific Ocean. Also, it should be noted that to encompass the Southern Hemisphere tropical cyclone season, which occurs from January through April, the limits of each tropical cyclone year are defined as 1 July to 30 June. Thus, the 1985 South-ern Hemisphere tropical cyclone year is from 1 July 1984 to 30 June 1985. (This is in contrast to the convention for labelling Northern Hemisphere tropical cyclones which is based on the calendar year - 1 January to 31 December - to include the seasonal activity from May through December.)

TABLE 4-1. SOUTH PACIFIC AND SOUTH INDIAN OCEAN

1985 SIGNIFICANT TROPICAL CYCLONES

		CALENDAR	NUMBER OF	MAXIMUM		BEST TRACK
		DAYS OF	WARNINGS	SURFACE	ESTIMATED	DISTANCE
TROPICAL CYCLONE	PERIOD OF WARNING	WARNING	ISSUED	WINDS - $KT(M/S)$	WRTE - WR	TRAVELED - NM(KM)
01S	11 NOV - 14 NOV	A	9	50 (26)	987	2026 (3752)
02S BOBALAHY	03 DEC - 07 DEC	5	10	EE (20)	983	1208 (2237)
03S EMMA	10 DEC - 12 DEC	3	- 6	45 (23)	990	1375 (2547)
	12 DEC - 13 DEC	. 3	Ă	35 (18)	996	845 (1565)
		5	10 6 4 10 2 5 5	75 (39)	968 990 971	569 (1054)
055 FRANK	23 DEC - 27 DEC 26 DEC - 27 DEC		10	45 (23)	300	464 (859)
050 403703	26 DEC - 27 DEC	2		65 (33)	971	1322 (2448)
07P MONICA	27 DEC - 29 DEC 29 DEC - 31 DEC	. 3	5	45 (23)	990	948 (1756)
09P DRENA	11 JAN - 13 JAN	3	5	50 (26)	988	612 (1133)
USP DRENA	17 25 25 25 25 25 25 25 25 25 25 25 25 25	10	20	65 (33)	975	1692 (3134)
105 CELESTINA	12 JAN - 21 JAN	10	20	100 (51)	973	3030 (5612)
	14 JAN - 18 JAN	5 3	8 4	35 (18)	950 996	874 (1619)
125	15 JAN - 17 JAN	3	. 4	105 (54)	937	2414 (4471)
13P NIGEL	16 JAN - 19 JAN 17 JAN - 22 JAN	. 4	8 11	100 (51)	937	1701 (3150)
14P ODETTE	1/ JAN - 22 JAN	0	11	70 (36)	071	1154 (2137)
155 DITKA	27 JAN - 31 JAN	2	,	75 (39)	9/1	2035 (3769)
16P FREDA	28 JAN - 30 JAN 30 JAN - 31 JAN	3	4	55 (28)	005	432 (800)
1/S GERTIE	30 JAN - 31 JAN	2	9 6 4 9	35 (28)	942 971 966 985 996	941 (1743)
	02 FEB - 06 FEB	. 5	, ,	50 (26)	990	1612 (2985)
19S ESITERA	05 FEB - 10 FEB	9	11 11	50 (26) 55 (28)	987	2408 (4460)
20S HUBERT	12 FEB - 17 FEB	6 6	11	50 (26)	983 987	511 (946)
21S FELISKA	14 FEB - 19 FEB	.8	15	50 (26)	987	1416 (2622)
22S ISOBEL	14 FEB - 21 FEB		23		981	
23S GERIMENA	14 FEB - 25 FEB	12		65 (33)		
	19 FEB - 20 FEB	2 8	4	35 (18)	996	
25S JACOB	19 FEB - 26 FEB	8	15		966	
	20 FEB - 22 FEB	3	6 5 17 5	45 (23)	990	978 (1811)
	05 MAR - 07 MAR	3	_ 5	55 (28)	983 930	1539 (2850)
28S KIRSTY	07 MAR - 14 MAR	8	17	115 (59)	930	1389 (2572)
29S LINDSAY	08 MAR - 10 MAR	3	5	55 (28)	970	579 (1072)
30P HINA	13 MAR - 17 MAR	5	10	135 (69)	920	
	20 MAR - 25 MAR	- 6	17	120 (62)	920	
	29 MAR - 01 APR	4 6 4	10	60 (31)	979	935 (1732)
33S HELISAONINA	11 APR - 16 APR	6	12	110 (57)	932	1769 (3276)
34S GRETEL	11 APR - 14 APR	4	6	45 (23)	900	483 (895)
35S MARGOT	12 APR - 17 APR	6	11	70 (36)	970	1111 (2058)
1985 TOTALS:		98*	320			

^{*}OVERLAPING DAYS INCLUDED ONLY ONCE IN SUM.

NOTE: NAMES OF CYCLONES GIVEN BY REGIONAL WAPNING CENTERS (NANDI, BRISBANE, DARWIN, PERTH AND MAUPITIUS) AND APPENDED TO JIWC WARNINGS, WHEN AVAILABLE.

2. SOUTH PACIFIC AND SOUTH INDIAN OCEAN TROPICAL CYCLONES

The 1985 year (1 July 1984 through 30 June 1985) was unusually active, with 35 tropical cyclones (see Table 4-1 and pages 142 through 146) reaching warning status. This exceeded the total of 30 tropical cyclones for 1984 (1 July 1983 - 30 June 1984) and proved to be the busiest year to date for JTWC. Six tropical cyclones occurred in the South Pacific east of 165 degrees east longitude, which matched the long term mean. The Australian area (105 to 165 degrees east longitude) accounted for 15 tropical cyclones as compared to the climatological mean of 10.3 - five more than normal. Fourteen tropical cyclones developed in the South Indian Ocean, which is almost twice the long term mean of 8.4 cyclones (See Tables 4-2 and 4-3). This represents the highest total for this area since at least the 1958-1959 season (Gray, 1979). In this regard, meteorological satellite surveillance of tropical cyclones has been updating climatologies since the early 1960s. (This meteorological watch from space detects tropical cyclones that might have previously gone undetected over the conventional data sparse oceanic areas.) Thus, tropical cyclone climatologies should benefit from

increased surveillance from space in some areas, for example, the South Indian Ocean.

Caveat: Intensity estimates for southern hemisphere tropical cyclones are derived primarily from satellite imagery evaluation (Dvorak, 1984) and from intensity estimates reported by other regional warning centers. Only, in very rare instances are the intensity estimates based on surface observational data. Estimates of the minimum sea-level pressure are usually derived from the Atkinson and Holliday (1977) relationship between the maximum sustained one-minute surface wind and the minimum sea-level pressure (Table 4-4). This relationship has been shown to be representative for tropical cyclones in the western North Pacific and is also used by the Australian regional warning centers to provide intensity estimates. However, since these pressure estimates are usually based on wind intensities that were derived from interpretation of satellite imagery, considerable caution should be exercised when using these resultant pressure values in future tropical cyclone work.

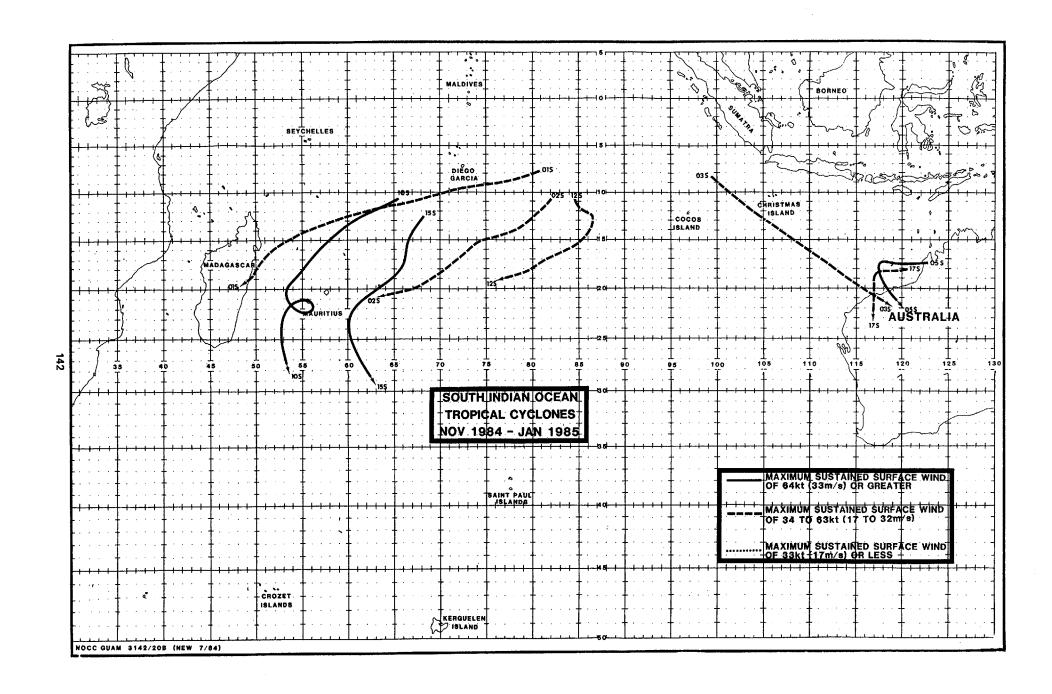
TABLE 4-2.	_	UENCY FOR		H PAC	AL CY					YEAR			
YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	<u>Jun</u>	TOTAL
(1959 - 1978) AVERAGE*				0.4	1.5	3.6	6.1	5.8	4.7	2.1	0.5		24.7
1981 1982 1983 1984	0 1 1	0 0	0 0	1 1 1	3 1 1 2	2 3 3 5	6 9 5	5 4 6 10	3 2 3 4	3 3 5 2	1 1 0 0	0 0 0	24 25 25 30
1985 (1981 - 1985)	ō	Ö		Ō	ī	7	9	9	6	3	ŏ	ŏ	35
AVERAGE CASES	0.6 3	0	0	0.8	1.6	4.0	6.8 34	6.8 34	3.6	3.2	0.4	0	27.8 139
* (GRAY, 1979)	3	J	J	4	•	20		34	10	10	2	U	139

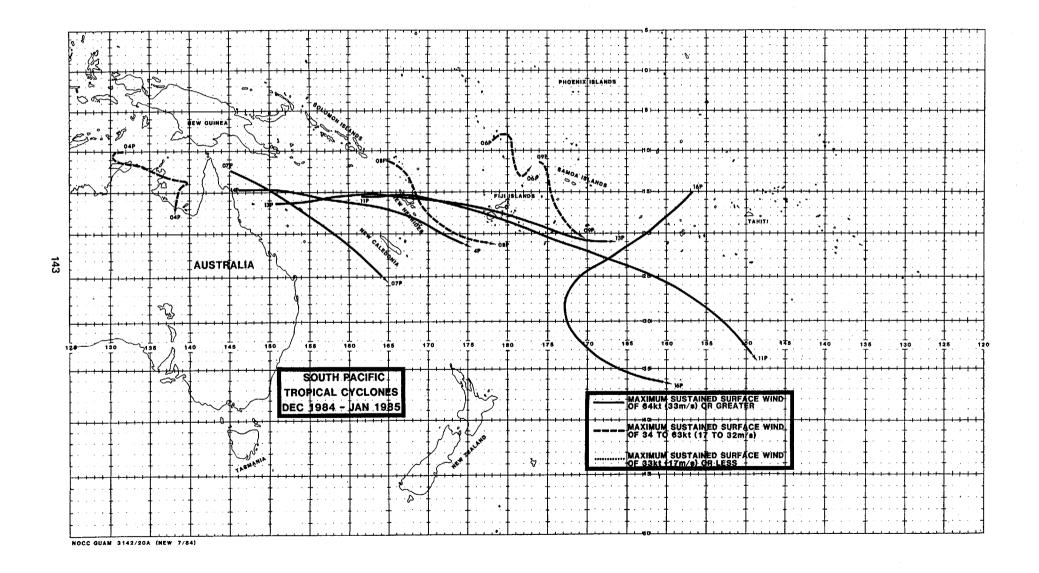
TABLE 4-3.	YEARLY VARIAT	ION OF TROPICAL CYCL	ONES BY OCEAN BASIN	
YEAR	(105E WESTWARD) SOUTH INDIAN	(105E-165E) AUSTRALIAN	(165E EASTWARD) SOUTH PACIFIC	TOTAL
(1959 - 1978) AVERAGE*	8.4	10.3	5.9	24.6
1981 1982	13 12	8 11	3 2	24 25
1983 1984 1985	7 14 14	6 14 15	12 2 6	25 30 35
(1981 - 1985)	12.0	10.8	5.0	27.8
AVERAGE CASES	60	54	25	139
* (GRAY, 1979)				

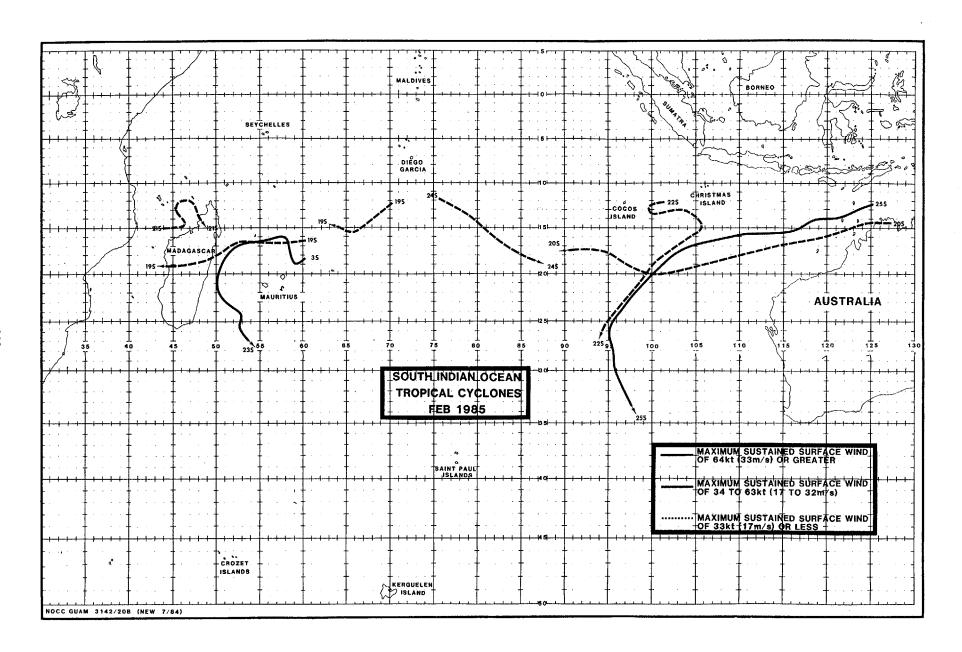
TABLE 4-4. MAXIMUM SUSTAINED SURFACE WIND VERSUS MINIMUM SEA-LEVEL PRESSURE (ATKINSON AND HOLLIDAY, 1977).

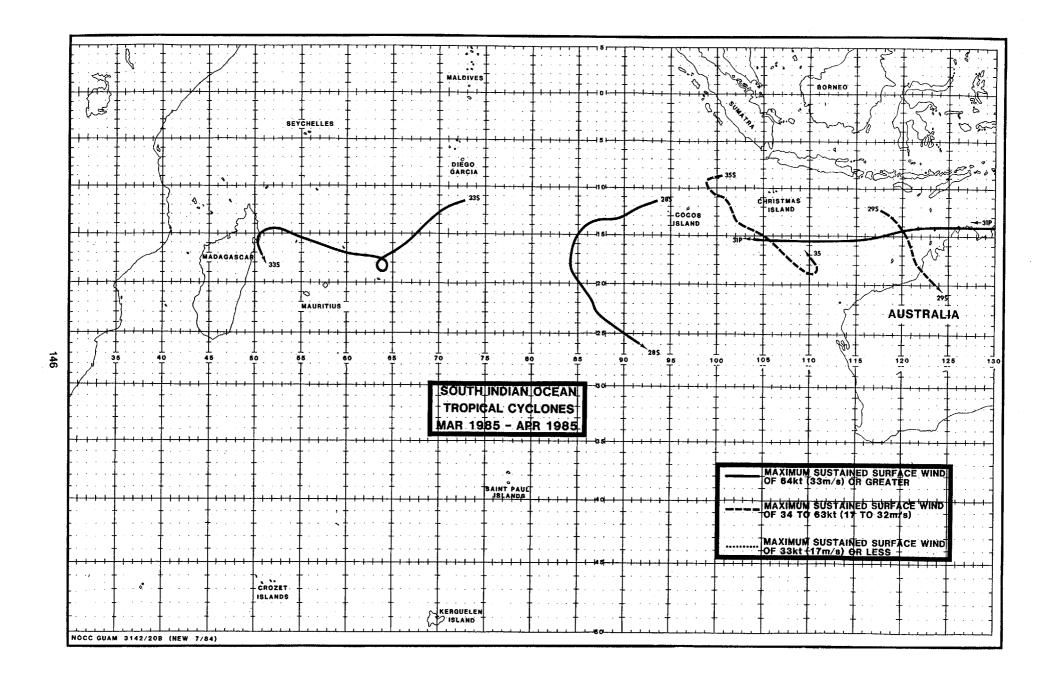
AND AND AND COOKS TAKED	EQUIVALENT MINIMUM
MAXIMUM SUSTAINED	SEA-LEVEL PRESSURE (MB)
SURFACE WIND (KT)	DEA-DEVEL FREEDOCKE (ID)
30	1000
35	
40	
45	
50	
55	
·	

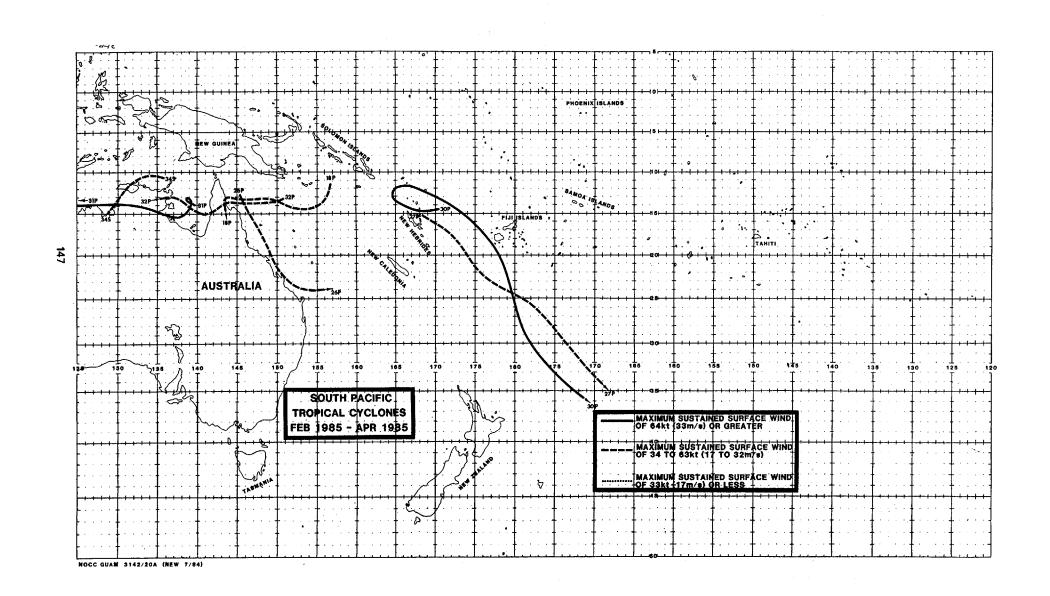
70	
75	
80	
85	
90	
95	
100	
105	
110	
115	
120	
125	916
130	910
135	
140	
145	
150	
155	
160	
165	
170	050











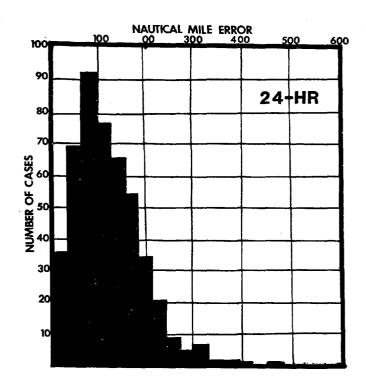
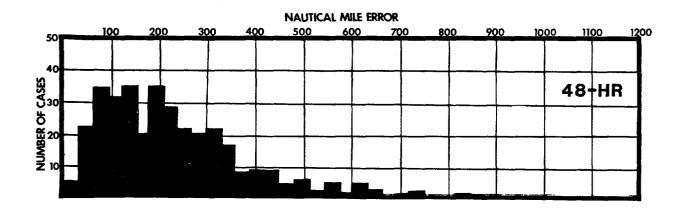
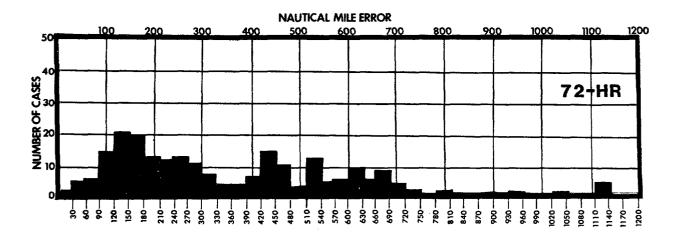


Figure 5-2. Frequency distribution of the 24-, 48-, and 72-hour forecast errors in 30 nm increments for all significant tropical cyclones in the western North Pacific during 1985.

FORECAST ERRORS (nm)

	24-HR	48-HR	72-HR
MEAN:	117	231	367
MEDIAN:	107	202	296
STANDARD DEVIATION:	72.6	153.3	254.5
CASES:	477	356	241





CHAPTER V - SUMMARY OF FORECAST VERIFICATION

1. ANNUAL FORECAST VERIFICATION

a. Western North Pacific Ocean

The positions given for warning times and those at the 24-, 48-, and 72-hour forecast times were verified against the final best track positions at the same valid times. The resultant vector and right angle (track) errors (illustrated in Figure 5-1) were then calculated for each tropical cyclone and are presented in Table 5-1. Figure 5-2 provides the frequency distributions of vector errors in 30 nm increments for 24-, 48-, and 72-hour forecasts of all

1985 tropical cyclones in the western North Pacific. A summation of the mean vector and right angle errors, as calculated for all tropical cyclones in each year, is shown in Table 5-2. A comparison of the annual mean vector errors for all tropical cyclones as compared to those tropical cyclones that reached typhoon intensity can be seen directly in Table 5-3. The annual mean vector errors for 1985 as compared to the ten previous years are graphed in Figure 5-3.

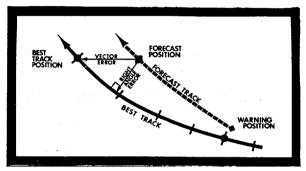


Figure 5-1. Illustration of the method to determine vector error and right angle error.

		SIG	RECAST E	RROR SUMM TROPICAL	ARY FOR CYCLONE	THE WEST	ERN NORTH I	PACIFIC S IN HM)				
	VECTOR ERROR	HASREING RT ANGLE ERBOR	NR OF WIRKS	VECTOR TERROR	24-HOUR RF ANGLE ERROR	HER OF HERNOGE	VECTOR ESPOR	49-HOUR RT ANGLE ERROR	HR OF HRNGS	VISCOR SPROR	72-HOU RT ANGLE ERROR	
01w. 15 z	LSTE 29	12	9	201	58	5	484	155	1	-	-	
02W. TS P	ABIAN 35	7	16	87	30	12	158	51		191	25	4
03W. TY G	AY 17	9	22	112	55	17	259	79	14	371	65	
04W. TO 0	48 48	27	70	177	110	6	21.3	-	2	-	-	
09H. TY B	NL 15	17	22	137	109	19	380	347	13	630	591	n
06H. TY I	PPQ 15	13	26	120	n	22	216	173	18	416	273	14
07W. TY J	277 18	13	40	132	80	30	342	170	21	639	345	13
06M. TY K	IT 14	,	33	115	56	28	305	156	22	523	259	1
09W. IS I	2E 18	12	24	129	51	10	293	77	6	657	17	
low. TY H		14	17	120	70	13	229	147	9	266	122	•
lin. Ty n	ELSON 10	9	26	64	47	22	132	88	17	182	148	1
12w. TY 0			37	1,46	66	33	238	111	26	272	128	21
13M. TY P			20	155	44	16	331	122	12	514	259	•
16w. 28 R		12	15	166	110	10	318	137	6	377	27	:
02C. TY 5		12	33	129	85	29	311	248	25	605	473	20
15w. TY T		15	22	122	70	18	97	56	14	141	115	10
16W. 75 V		10	13	160	84	9	129	104	5	249	-	,
17W, 2S W		14	11	87	69	7	140	136	3	-	-	•
16W. TY A		6	16	44	30	12	87	63	В	120	84	•
19W. TY B		12	23	93	43	19	245	106	15	436	230	11
20W. TY C		11	16	104	93	13	179	159	9	196	139	-
219. STY D 229. TS E		10	33 17	63 149	32 117	29 13	90 363	31 311	25	131 581	68	23
234. TS E		7	17 38	149	117 58	13 34		136	9 30		430	
294. TS G		16	23	114			242			414	231	21
29W. TS G 25W. TY H		15	23 26	114	5). 83	17 22	159 201	58 124	11 16	238 159	80 102	
26W. TS I		18	14	132	73	12	163	41	9	170	51	1

TABLE 5-2

ANNUAL MEAN FORECAST ERRORS (NM) FOR THE WESTERN NORTH PACIFIC

	24	-HOUR	48	B-HOUR	72	2-HOUR
YFAR	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1971	111	64	212	118	317	117
1972	117	72	245	146	381	210
1973	108	74	197	134	253	162
1974	120	78	226	157	348	245
1975	138	84	288	181	450	290
1976	117	71	230	132	338	202
1977	148	83	283	157	407	228
1978	127	75	271	179	410	297
1979	124	77	226	151	316	223
1980	126	79	243	164	389	287
1981*	123	75	220	119	334	168
1982*	113	67	237	139	341	206
1983*	117	72	259	152	405	237
1984*	117	66	233	137	363	231
1985*	117	66	231	134	367	214

The technique for calculating right angle error was revised in 1981; therefore, a direct correlation in right angle statistics cannot be made for the errors computed before 1981 and the errors computed since 1981.

TABLE 5-3.	ANNUAL	MEAN	FORECAST ERRORS	(NM)	FOR WE	STERN	NORTH P	ACIFIC
			24-HOUR		48-HOU	R		72-HOUR
YEAR		ALL	TYPHOON*	ALL	TY	PHOON	ALL	TYPHOON*
1950-58			170					
1959			117**			267**		
1960			177**			354**		
1961			136			274		
1962			144			287		476
1963			127			246		374
1964			133			284		429
1965			151			303		418
1966	į.		136			280		432
1967			125			276		414
1968			105			229		337
1969			111			237		349
1970		104	98	190		181	279	272
1971		111	99	212		203	317	308
1972		117	116	245		245	381	. 382
1973		108	102	197		193	253	
1974		120	114	226		218	348	351
1975		138	129	288		279	450	442
1976		117	117 .	230		232	338	336
1977		148	140	283		266	407	390
1978		127	120	271		241	410	459
1979		124	113	226		219	316	319
1980		126	116	243		221	389	362
1981		123	117	220		215	334	
1982		113	114	237		229	341	
1983		117	110	259		247	405	384
1984		117	110	233		228	363	361
1985		117	112	231		228	367	355

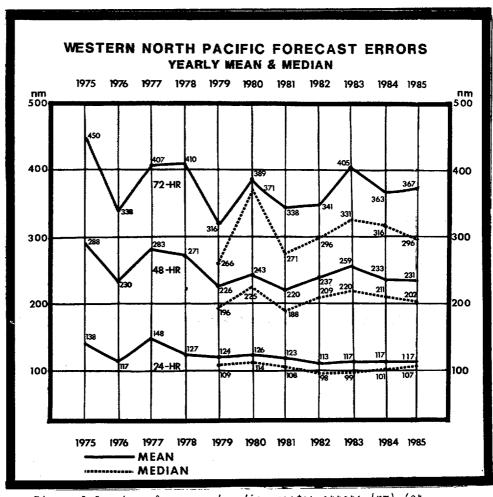


Figure 5-3. Annual mean and median vector errors (nm) for all tropical cyclones in the western North Pacific.

b. North Indian Ocean

The positions given for warning times and those at the 24-, 48-, and 72-hour valid times were verified for tropical cyclones in the North Indian Ocean by the same methods used for the western North Pacific. It should be noted that due to the low number of North Indian Ocean tropical cyclones, these error statistics should not be taken as representative of any trend.

Table 5-4 is the forecast error summary for the North Indian Ocean. Table 5-5 contains the annual average of forecast errors for each year through 1974. Vector errors are plotted in Figure 5-4 (Seventy-two hour forecast errors were evaluated for the first time in 1979). There were no verifying 72-hour forecasts in 1983 and 1985.

	TABLE 5-	4.										· · · · · · · · · · · · · · · · · · ·	
	÷					R SUMMARY PICAL CYCI							
				SIGNIFIC	CANT TRO	PICAL CYCI	ONES FO	K 1905.	(EKKOK IN	MFI			
			WARNING			24-HOUR			8-HOUR			72-HOUR	
		POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT ERROR	RT ANGLE ERROR	NR OF WRNGS	POSIT	RT ANGLE ERROR	NR OF WRNGS	POSIT	RT ANGLE ERROR	NR OF WRNGS
1.	TC 01B	33	14	В	134	29	4						
2.	TC 02A	24	14	12	61	38	9	115		4			
з.	TC 03B	26	20	7	141	42	3 .						
4.	TC 04B	18	8	4									
5.	TC 05B	47	16	12	188	71	8	369	109	4			
6.	TC 06B	21	16	11	113	57	6				•		
ALL	FORECAST:	24	14	12	61	38	9	115		4			

TABLE 5	-5							
	ANNUAL ME	an forecast ei	RRORS FOR	THE NORTH IN	DIAN OCEAN			
	24.	-HOUR	18-	-HOUR	72-HOUR			
YEAR		RIGHT ANGLE	VECTOR	RIGHT ANGLE				
	·							
1971*	232		410	_	-	-		
1972*	224	101	292	112	-	-		
1973*	182	99	299	160	_	-		
1974*	137	81	238	146	-	-		
1975	145	99	228	144	-			
1976	138	108	204	159	-	-		
1977	122	94	292	214	-	-		
1978	133	86	202	128	-			
1979	151	99	270	202	437	371		
1980	115	73	93	87	167	126		
1981**	109	65	176	103	197	73		
1982**	138	66	368	175	762	404		
1983**	117	46	153	67	-	- - -		
1984**	154	71	274	127	388	159		
1985**	123	51	242	109	-	-		
	_					1. 2. 1		
		of Bengal and						
the	JTWC area o	f responsibil:	ity until	the 1975 trop	bicar cacr	one season.		
		3 3 4				i- 1001.		
** The	technique t	or calculating	g right an	ngie error wa	s revised	10 1901;		
the	refore, a di	rect correlat	ion in rig	gnt angle sta	tistics ca	nnot de made		
for	the errors	computed before	re 1981 ar	na the errors	computed	since Tagi.		

c. South Pacific and Indian Oceans

The positions given for warning times and those at the 24- and 48-hour valid times were verified for tropical cyclones in the South Pacific and South Indian Oceans by the same methods used for the western North Pacific.

Table 5-6 is the forecast error summary for the South Pacific and Indian Oceans and Table 5-7 contains the annual average of forecast errors for each year since 1981. Vector errors are plotted in Figures 5-5 (Seventy-two bours forecasts are not issued in the southern hemisphere).

TABLE 5-6									
TABLE 3-6			B00000000	Bunon or	MMARY FOR	with com	PR DACTES		
		-	AND SOUTH	H INDIAN	OCEAN SI	GNIFICANT	TROPICA		
			CICI	ONES FOR	1985. (1	SARORS IN	NPI)		
		WA DUTNO			24-HOU	n		40-000	
	POSIT	WARNING RT ANGLE	NR OF	POSIT	RT ANGLE	NR OF	POSIT	48-HOUR RT ANGLE	
	ERROR	ERROR	WRNGS	ERROR	ERROR	WRNGS	ERROR	ERROR	WRNGS
TC 01S	53	18	8	105	38	6	180	78	5
TC 02S BOBALAHY	29	22	10	105	76	9	181	121	7
TC 03S EMMA	32	19	6	148	46	-4	428	67	. 2
TC 04P	35	. 19	4	209	152	2	-	-	-
TC 059 FRANK	22	19	10	94	66	8	241	180	6
TC 06P	54 45	29 26	1 5	107 135	77 90	1 3	214 235	116 206	1
TC 07P MONICA	43	22	5	176	48	5	259	57	1
TC 08P	21 23	21 23	1 4	91 195	55 167	1 2	-	=	` <u>-</u>
TC 09P DRENA	54	37	6	99	62	5	106	57	3
TC 10S CELESTINA	42	27	20	142	85	18	228	110	13
TC 11P ERIC	31 67	22 67	11 1	239 221	58 216	9 1	510 400	145 396	. 7 1
TC 12S	50	47	4	138	33	3	.165	22	1
TC 13P NIGEL	21	17	11	105	43	9	193	58	7
TC 14P ODDETTE	28	14	10	98	42	8	120	55	6
TC 15S DITRA	28	16	9	122	59	8	145	90	6
TC 16P FREDA	42	23	6	187	71	4	359	305	2
TC 17S GERTIE	18	19	4	152	104	2	_	_	-
TC 18P	50	32	9	146	124	7	219	142	4
TC 19S ESITERA	64	37	10	152	67	8	201	91	5
TC 20S HUBERT	-24	17	11	142	89	10	375	229	9
TC 21S FELIKSA	37 33	5 19	1 10	135 145	105 65	1 8	220	129	5
TC 22S ISOBEL	54	26	15	179	94	13	242	130	11
TC 23S GERIMENA	46	31	23	94	53	22	119	58	20
TC 24S	110	76	4	407	239	3	1124	613	1
TC 25S JACOB	20	14	15	80	66	13	152	113	11
TC 26P PIERRE	31	16	6	157	86	5	173	110	3
TC 27P GAVIN	62	56	8	203	131	6	182	159	2
TC 28S KIRSTY	27	16	16	101	68	14	232	161	12
TC 29S LINDSAY	39	23	5	218	99	. 3	565	235	1
TC 30P HINA	29	18	13	160	94	11	410	184	9
TC 31P SANDY	20	9	12	109	68	10	194	132	9
TC 32P TANYA	30	16	10	60	34	9	82	58	9
TC 33S HELISAONINA	32	21	11	192	110	10	403	243	9
TC134S GRETEL	30	18	6	102	94	4	231	-	2
TC 35S MARGOT	28	21	11	178	119	10	404	237	8
ALL FORECASTS:	36	23	332	138	78	273	242	133	199

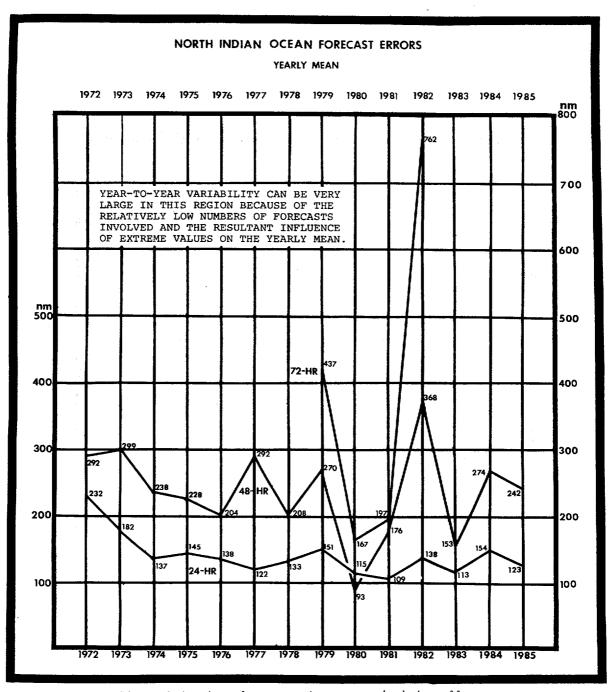


Figure 5-4. Annual mean vector errors (nm) for all tropical cyclones in the North Indian Ocean.

2. COMPARISON OF OBJECTIVE TECHNIQUES

a. General

Objective techniques used by JTWC are divided into five main categories:

- (1) extrapolation;
- (2) climatological and analog techniques;
- (3) model output statistics;
- (4) dynamic models; and
- (5) empirical and analytical techniques;

In September 1981, JTWC began to initialize its array of objective forecast techniques (described below) on the six-hour-old preliminary best track position (an interpolative process) rather than the forecast (partially extrapolated) warning position, e.g. the 0600Z warning is now supported by objective techniques developed from the 0000Z preliminary best track position. This operational change has yielded several advantages:

*techniques can now be requested much earlier in the warning development time line, i.e. as soon as the track can be approximated by one or more fix positions after the valid time of the previous warning;

*receipt of these techniques is virtually assured prior to the development of the next warning; and

*improved (mean) forecast accuracy. This latter aspect arises because JTWC now has a more reliable approximation of the short-term tropical cyclone movement. Further, since most of the objective techniques are biased for persistence, this new procedure optimizes their performance and provides more consistent guidance on short-term movement, indirectly yielding a more accurate initial position estimate as well as lowering 24-hour forecast errors.

- b. Description of Objective Techniques
- (1) XTRP Forecast positions for 24- and 48-hours are derived from the extension of a straight line which connects the most recent and 12-hour old preliminary best track positions.
- (2) CLIM A climatological aid providing 24-, 48-, and 72-hour tropical cyclone forecast positions (and intensity changes in the western North Pacific) based upon the position of the tropical cyclone. The output is based upon data records from 1945 to 1981 for the western North Pacific Ocean and 1900 to 1981 for the North Indian Ocean.
- (3) TPAC Forecast positions are generated from a blend of climatology and persistence. The 24- and 48-hour positions are equally weighted between climatology and persistence and the 72-hour position is one quarter persistence and three quarters climatology. Persistence is a straight line extension of a line connecting the current and 12-hour old positions. Climatology is based on data from 1945 to 1981 for the western North Pacfic Ocean and 1900 to 1981 for the North Indian Ocean.

- (4) TYAN 78 An updated analog program which combines the earlier versions TYFN 75 and INJAN 74. The program scans a 30-year climatology with a similar history (within a specified acceptance envelope) to the current tropical cyclone. For the western North Pacific Ocean, three forecasts of position and intensity are provided for 24-, 48-, and 72-hours: RECR a weighted mean of all tropical cyclones which were categorized as "recurving" during their best track period; STRA a weighted mean of all accepted tropical cyclones which were categorized as moving "straight" (westward) during their best track period; TOTL a weighted mean of all accepted tropical cyclones, including those used in the RECR and STRA forecasts. For the North Indian Ocean, a single (total) forecast track is provided for the 12-hour intervals to 72 hours.
- (MOS) routine based on the geostrophic steering at the 850-, 700-, and 500-mb levels. The steering is derived from the HATTRACK point advection model run on Global prognostic fields from the FLENUMOCEANCEN NOGAPS prediction system. The MOS forecast is then blended with the 6-hour past movement to generate the forecast track.
- (6) OTCM (One-way Interactive Tropical Cyclone Model) A course-mesh, three-layer in the vertical, primative equation model with a 205 km grid spacing over a 6400 X 4700 km domain. The model's fields are computed around a bogused, digitized cyclone vortex using FLENUMOCEANCEN Numerical Variational Analysis (NVA) or NOCAPS prognostic fields for the specified valid time. The past motion of the tropical cyclone is compared to initial steering fields and a bias correction is computed and applied to the model. FLENUMOCEANCEN NOCAPS global prognostic fields are used at 12-hour intervals to update the model's boundaries. The resultant forecast positions are derived by locating the 850 mb vortex at six-hour intervals to 72-hours.
- (7) NTCM (Nested Tropical Cyclone Mcdel) A primative equation model with properties similar to the OTCM. The NTCM differs by containing a finer scale "nested" grid, initializing on NVA <u>analysis</u> fields only, not containing a (persistence) bias correction, and being a channel model which runs independent of FLENUMOCEANCEN prognostic fields (not requiring updating of its boundaries). The "nested grid" covers a 1200 X 1200 km area with a 41 km grid spacing which moves within the course mesh domain to keep an 850 mb vortex at its center.
- (8) TAPT An empirical technique which utilizes upper-tropospheric wind fields to estimate acceleration associated with the tropical cyclones interaction with the mid-latitude westerlies. It includes guidelines for duration of acceleration, upper-limits, and probable path of the cyclone.
- (9) CLIP -- A statistical regression technique based on climatology, current intensity and position and past movement. This technique is used as a crude measure of real forecast skill when verifying forecast accuracy.

TABLE 5	-7.			
ANNUAL I	MEAN FOREC	CAST ERRORS (N SOUTH INDIAN		OUTH PACIFIC AND
	24	-HOUR	48	-HOUR
YEAR	24 2 VECTOR 165 144 154 133	RIGHT ANGLE	VECTOR	RIGHT ANGLE
1981 1982		119 91	315 274	216 174
1983 1984	154	84 73	288 231	150 124
1985	138	78	242	133

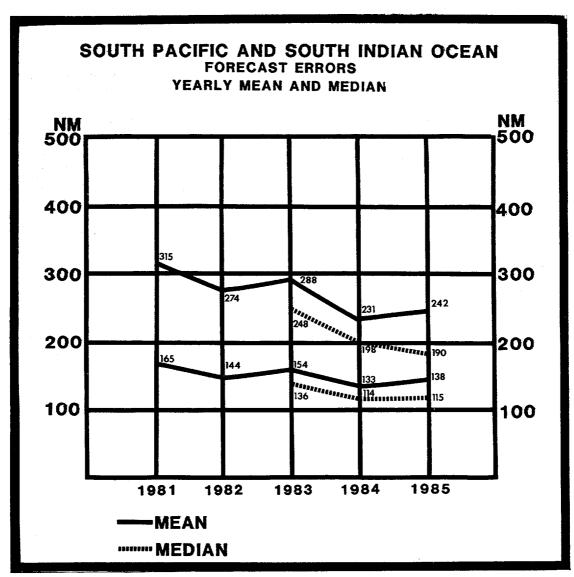


Figure 5-5. Annual mean and median vector errors (nm) for all tropical cyclones in the South Pacific and South Indian Oceans.

- (10) THETA E An empirically derived relationship between a tropical cyclone's minimum sea-level pressure (MSLP) and 700 mb equivalent potential temperature (Theta-E) was developed by Sikora (1976) and Dunnavan (1981). By monitoring MSLP and trends, the forecaster can evaluate the potential for sudden, rapid deepening of a tropical cyclone.
- (11) WIND RADIUS Following an analytic model of the radial profiles of sea-level pressures and winds in mature tropical cyclones (Holland, 1980), a set of radii for 30-, 50-, and 100-knot winds based on the tropical cyclone's maximum winds have been produced to aid the forecaster in determining forecast wind radii.
- (12) DVORAK An estimation of tropical cyclone's current and 24-hour forecast intensity is made from interpolation of satellite imagery (Dvorak, 1984) and provided to the forecaster. These intensity estimates are used in conjunction with other intensity-related data and trends to forecast tropical cyclone intensity.

JTWC currently uses TPAC, TAPT, TYAN78, COSMOS, OTCM and NTCM operationally to develop track forecasts.

c. Testing and Results

A comparison of selected techniques is included in Table 5-8 for all western North Pacific tropical cyclones, Table 5-9 for all North Indian Ocean tropical cyclones, and Table 5-10 for the South Pacific and South Indian Ocean tropical cyclones. In these tables, "X-axis" refers to techniques listed vertially. The example in the 449 cases available for a (homogeneous) comparison, the average vector error at 24 hours was 123 nm (228 km) for COSMOS and 117 nm (217 km) for OTCM. The difference of 5 nm (9 km) is shown in the lower right. (Differences are not always exact, due to computational round-off which occurs for each of the cases available for comparison).

TABLE 5-9. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE NORTH INDIAN OCEAN

24-HOUR FORECAST ERRORS (NM)

	JΤ	wc	то	TL	CLI	Р	REC	R	COSM	1	NT	CM	отс	M	TP	AC	CL	.IM	ХT	RP	HP6	AC
JTWC	30 123	123																				
TOTL	28 107	126 -17	29 105	105										•	UMBER OF		X-AX: TECHN	IQUE				
CLIP	0	0	9	0	0	0								Ľ	CASES	\bot	ERRO	R				
RECR	0	0	9	0	0	0	0	0							-AXIS	me I	ERROI DIFFERI					
COSM	0	9	0	0	0 0	0	0	8	0	0					RROR	-	Y - :					
NTCM	20 103	120 -16	21 105	104	0	0	0	9	0	0	21 105	105										
отсм	29 94	123	29 29	105 -12	0	0	0	0	0	0		105 -10	30 94	94								
TPAC	29 102	123 -20	29 103	105 -1	0	0	0	0	0	0	21 103	105 -1	30 101	94 7	30 101	101 0						
CLIM	29 132	123	29 133	105 27	0	0	0	9	6	0	21 128	105 24	30 132	94 38	30 132	101 31	30 132	132				
XTRP	29 137	123	29 136	105 31	0	0	0	0	.0	0	21 138	105 34	30 133	94 40	30 133	101 32	30 133	132	30 133	133 0		
HPAC	29 100	123 -22	29 101	105	9	0	0	0	0	0	21	105	30 99	94	30 99	101	30 99	132	30	133 -33	30 99	

48-HOUR FORECAST ERRORS (NM)

	JT	พс	τo	TL	CLI	Р	REC	R	cos	M	NT	'CM	от	CM	ŤΡ	AC	CL	IM	ХT	RP	HP	AC
JTUC	242	242 Ø																			_	
TOTL	8 231	242 -10	12 181	181 0													IAL JI G (TYA		RECAST			
LIP	9	9	0	9	0	0								1	NTCM -	NESTE	TROP	ICAL (E MODEL		
ECR	0	0	0	0	0	0	0	0							TPAC - CLIM -	CLIM :	AND PE	RSIST	ence b			
OSM	8	8	0	0	0	0	0	0	0	0					XTRP - HPAC -							
TCM	207	203 4	216	174 42	0	0	0	9	9	9	216	216		•							_	
TCM	195	270 -74	195	219 -24	0	0	0	0	0	0	812	240 -27	195	195 Ø								
PAC	258	242 16	12 189	181 8	9	0	9	0	0	0	208	216	22S	195 28	12 189	189						
LIM	330 8	242 88	309 309	181 128	0	8	0	0	0	8	316	216 100	30E	195 112	12 309	189 120	309 309	30S				
TRP	243	242	12 227	181 46	0	0	9	0	9 8	8	7 195	216 -20	280	195 85	12 227	189 38	227	309 -81	12 227	227 0		
PAC	8 257	242	12 189	181 8	0	0	0	8	9	0	208	216	221	195 27	12 189	189	12	309 -119	12 189	227 -37	12 189	1

72-HOUR FORECAST ERRORS (NM)

	JTW	С	то	TL	CLI	Р	REC	Ŕ	COS	M	NTC	M	отс	M	TP	AC	CL	.IM
JTWC	0	0					<u>. </u>											
TOTL	0	0	35ø	350 0														
CLIP	0	0	0	0	0 0	ø ø												
RECR	0	0	0	0	0	0	0	0										
COSM	0	0	0	0 0	0	Ø Ø	0 0	0	0	0								
NTCM	8	0	0	0	0	0	0	0	0 0	ø ø	9 9	0						
OTCM	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0				
TPAC	0	Ø Ø	1 489	350 138	0	ø ø	0	0	0	0	0 0	0	0	0	489	489 0		
CLIM	0	ø 0	639 639	3 50 288	0 0	0	Ø Ø	0 0	• 0 0	ø ø	0 0	0 0	0	0	639	489 150	639 639	639 0

TABLE 5-8. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE WESTERN NORTH PACIFIC OCEAN

24-HOUR FORECAST ERRORS (NM)

	JT	wc	то	TL	CL.	.IP	RE	CR	cc	SM	NT	CM	01	СМ	TP	AC	CL	.IM	хт	RP	HP	AC
JTWC	477 117	117											_									
TOTL	455 120	117	463 120	120									1	MBER OF	1	X-AXIS ECHNI						
CLIP	333 122	116 6	329 121	121	338 122	122						,	1 -"	SES	┿	ERROR	4					
RECR	429 132	117	434 . 132	119 13	308 132	122	436 132	132						AXIS		ERROR FFEREN	ICE					
COSM	449 123	118	442 124	120	323 125	121	421 124	132	457 124	124	/	/	EF	ROR		Y - X						
NTCM	368 368	116 6	359 123	121	337 124	121	338 124	133 -8	359 123	123	373 123	123										
OTCM	460 115	116	450 116	118 -1	327 117	120	426 117	130 -12	449 117	123 -5	363 115	121 -5	46 7 116	116								
TPAC	465 122	117 5	456 121	119	330 121	121	0E4 122	131 -8	448 122	123	365 123	123	457 121	116 5	472 122	122						
CLIM	468 160	117 43	458 160	119 40	331 161	121 39	431 160	131 29	450 159	123 36	366 163	123 40	459 159	116 43	472 160	122 38	475 159	159 0				
X) RP	465 128	117	456 128	119	330 128	121	429 128	131 -1	447 129	123	363 127	123 4	456 127	115 12	470 129	121	472 128	159 -30	472 128	128		
HPAC	465 120	117 3	456 120	119 1	330 121	121 0	429 121	131 -9	447 120	123	363 121	123	456 119	115 3	470 120	121 0	472 120	159 -38	472 120	128	472 120	120

48-HOUR FORECAST ERRORS (NM)

	JT	MC	TO	TL	CL	IP	RE	CR	· co	SM	NT	CM	ОТ	CM	ΤP	AC	CL	IM	×T	RP	HP	AC
JTWC	356 231	231					-					-			FFICIA			CAST		7		
TOTL	342 249	231 18	365 249	249									CLI	P - C	CLIPPER	1				ı		
CLIP	250 255	23 232	263 253	251 2	268 268	253							COS	SM - C	ECURVE COSMOS LESTED	(MOS)	•		MADEL	1		
RECR	319 265	231 34	339 339	247 20	243 271	255 16	339	868 868					OTO	CM - C	NE-WAY	TROP:	ICAL (YCLON	E MODE	L		
COSM	333 333	836 836	346 240	252 -11	254 247	254 -6	327 240	267 -25	355 238	238			CLI	M - C P - 1	LIMATO 2-HOUR	LOGY	APOLAT	ION		-		
NTCM	276 231	234 -2	286 231	252 -20	267 231	253 -20	266 235	275 -39	281 233	239 -5	294 231	231	HPI	AC - N	EAN OF	XTRP	AND C	LIM				
OTCM	338 234	232	348 234	248 -12	253 228	248 -19	239 326	265 -25	345 236	235	280 227	227	360 234	234								
TPAC	348 235	231 4	359 359	248 -11	262 262	252 -16	334 238	267 ~28	348 236	237 0	288 237	23 <u>1</u>	352 233	234 Ø	370 235	235 0						
CLIM	349 296	231 65	361 301	248 52	263 301	252 48	335 304	268 37	350 298	237 61	308 308	231 76	354 299	234 65	370 299	235 64	372 2 9 9	299				
XTRP	347 271	231 40	359 268	248 21	565 565	252 14	568 333	267	348 273	237 35	287 267	231 35	352 265	234 32	369 269	234 34	370 268	-59 598	370 268	898 8		
HPAC	347 234	231 3	359 235	248 -12	262 235	252 -16	333 333	267 -29	348 234	237 237	287 236	231 4	352 231	234 -2	369 233	234 0	370 233	298 -64	370 233	268 -34	370 233	233 0

72-HOUR FORECAST ERRORS (NM)

1	JΤ	шc	то	TL	CL	ΙP	RE	ÇR	co	SM	NТ	СМ	от	СМ	ΤР	AC	CL	IM
JTWC	241 367	367 Ø	-															
TOTL	228 373	363 11	266 374	374 Ø														
CLIP	168 357	357 Ø	190 367	370 -2	195 368	368 0												
RECR	217 408	371 37	249 413	375 38	181 417	373 44	250 414	414 0										
COSM	226 367	373 -5	253 386	377 8	186 406	370 36	242 395	412 -16	380 263	986 0								
NTCM	186 345	367 -21	208 353	374 -21	194 348	370 -20	196 357	412 -55	207 353	387 -33	216 352	352 0						
OTCM	188 397	358 40	212 398	364 34	147 389	349 40	198 400	407 -6	213 403	370 33	168 393	329 64	222 299	399 8				
TPAC	232 374	369 5	258 378	376 1	188 369	371 -1	245 372	413 -41	256 375	382 -7	208 379	351 28	214 380	400 -20	268 373	373 Ø		
CLIM	234 421	367 54	261 426	375 51	190 415	369 46	246 418	413 5	258 421	381 40	210 427	352 75	216 434	399 35	268 423	373 51	271 422	422 0

TABLE 5-10. 1985 ERROR STATISTICS FOR SELECTED OBJECTIVE TECHNIQUES IN THE SOUTH INDIAN AND SOUTH PACIFIC OCEANS

24-HOUR FORECAST ERRORS (NM)

	ΤL	шc	то	TL	CLI	P	REC	R	COSM	i	NT	CM	от	CM	TP	AC	CL	IM	×τ	RP	HP	AC
JTWC	273 138	138 0			.*									_				_			-	
TOTL	196 112	128 -15	198 112	112										1	MBER OF	7	X-AXIS ECHNIQ					
CLIP	9 9	0	0	0	0	0								CA	SES		ERROR					
RECR	0	0	0	0	9	9	0	0							AXIS HNIQUE		ERROR FFEREN	CE				
COSM	0	0	0	0	0	Ø .	. 0	0	0	0					ROR		Y - X	·				
NTCM	213 144	140	167 133	114 20	0 0	0	0	0	0	0	215 144	144										
OTCM	213 139	135 4	175 135	110 25	0	0	0 0	0	0	0	184 140	137 2	214 138	138								
TPAC	235 132	135 -1	197 125	112	0	0	9	0	0	0	199 133	140	212 131	137 -5	237 132	135						
CLIM	236 184	134 50	198 172	112 60	0	0	9	0	0	0	200 186	140 45	213 184	138 46	237 183	132 51	238 183	183 0				
XTRP	236 116	134 -17	197 111	112	0	8	0	0	0	0	200 115	140 -24	214 113	138	236 116	132 -15	237 116	184 -67	238 116	116 0		
HPAC	235 131	134	197 124	112 12	0	0	. 0	0	0	9	199 133	140 -6	213 130	138 -7	236 131	132 0	237 131	184 -52	237 131	116 15	237 131	13 <u>1</u>

48-HOUR FORECAST ERRORS (NM)

	JΤ	MC	то	TL	CLIF	•	RECE	ł	COSM	1	NT	CM	от	СМ	TP	AC	CL	IM	XT	RP	HPA	AC
JTWC	199 242	242																				
TOTL	148 232	225 7	160 242	242 0					•						JTWC TOTL CLIP	- AN	FICIAL ALOG (IPPER			AST		
CLIP	0	0	0	ø ø	0	0									RECR	- RE	CURVER SMOS (N 78)			
RECR	0	0	0	0	0	9	9	0							NTCM	- NE	STED I B-WAY	ROPIC				
COSM	0	0	0	0	0	0	9	0	0	0					CLIM	- CL	IM AND	OGY			ND	1
NTCM	163 269	252 18	136 256	249 7	9	0	9	0	0	0	174 274	274 0			HPAC		-HOUR AN OF					_]
OTCM	158 292	243 50	137 288	243 45	0	0	9 9	0	0	0	147 297	266 31	169 295	295 0	-							
TPAC	177 267	244 23	159 258	243 15	0	9	0	0	0	0	159 271	270 1	163 268	292 -24	189 268	868 268						
CLIM	178 351	244 108	160 347	242 104	0	0	0	0	0	0	160 353	268 85	164 351	892 292	189 352	268 84	190 351	351 Ø				
XTRP	181 251	244 7	159 234	243 -8	0	0	0	0	9	0	165 258	269 -10	169 251	295 -43	188 258	269 -10	189 257	352 -94	195 259	259 Ø		
HPAC	177 266	243 23	159 257	243 14	0 0	0 0	0 0	0	0 0	0	159 270	269 1	164 265	292 -25	188 268	9 269	189 267	352 -84	189 267	257 10	189 267	267 Ø

72-HOUR FORECAST ERRORS (NM)

	JTW	С	то	TL	CLI	P	REC	R	cos	M	нт	CM	ОТ	СМ	TP	ac	CL	IM
JTWC	0	0			· ·									,				
TOTL	0	0	122 351	351 0														
CLIP	0	0	0	0 0	0	0												
RECR	0	Ø Ø	0	0 0	0	0	ø ø	Ø Ø										
COSM	0	0	0	0	0	ø 9	0	0	0 0	0								
NTCM	0	0	104 394	357 37	ø ø	0 0	0	0	Ø Ø	0	128 415	415 0						
отсм	0	0	101 456	340 116	0 0	0	0 0	0	0	0	107 456	405 51	124 472	472 0				
TPAC	0	0	122 424	351 73	0 0	0	0	0	0	0	124 432	410 21	121 427	462 -33	146 433	433 0		
CLIM	0	0	122 503	351 152	0	0	0	0	0	0	124 505	410 95	121 497	462 35	146 506	433 73	146 506	506 0

CHAPTER VI - APPLIED TROPICAL CYCLONE RESEARCH SUMMARY

The following articles delineate the extent of the research program at the Naval Environmental Prediction Research Facility (NAVENVPREDRSCHFAC) dedicated to supporting the operations at Joint Typhoon Warning Center (JTWC). There are three major research departments at NAVENVPREDRSCHFAC, each contributing to the overall program; research on current and future tropical cyclone models is performed in the Numerical Modeling Department, the Tactical Applications Department conducts statistical application studies, and the Satellite Processing and Display Department develops computer interactive techniques.

TROPICAL CYCLONE AIDS (TCAIDS) FOR SATELLITE-DATA PROCESSING AND DISPLAY SYSTEM (SPADS)

(Tsui, T. and A. Truschke, NAVENVPREDRSCHFAC)

TCAIDS is a system residing on SPADS composed of all existing tropical cyclone utility routines. Most of these routines use digital satellite data together with the environmental information to assist forecasters in making a low cost and timely tropical cyclone forecast. TCAIDS includes two tropical cyclone movement aids, one intensity forecasting aid, one satellite image rotation utility, and a 16-image looping display utility. The movement forecast aids are the satellite IR pattern regression routine — ADAPT forecaster and the National Hurricane Center's Climatology-Persistence (CLIPER) routine. The intensity forecast aid uses the tropical cyclone spiral characteristics to predict the growth of the storm. This intensity forecasting program also provides various image enhancement routines.

NORTH PACIFIC TROPICAL CYCLONE CLIMATOLOGY

(Tsui, T. and R. Miller, NAVENVPREDRSCHFAC)

A tropical cyclone climatology for the North Pacific has been developed. Data used for the western basin were taken from the JTWC Tropical Cyclone Data Base and covered a period of 40 years, 1945-1984. Eastern basin data spanned the 34 year period 1949-1982 and were obtained from the Consolidated World-Wide Tropical Cyclone Data Base, National Climatic Data Center, Ashville, North Carolina. Storms for both basins were sorted according to month/day of the year into twenty-four 31-day overlapping periods. For each period, four charts are supplied: 1) actual storm paths; 2) mean storm paths; 3) average storm speed; and 4) storm constancy and frequency.

ADAPTION OF CSUM

(Tsui, T. and A. Truschke, NAVENVPREDRSCHFAC)

CSUM is a statistical tropical cyclone prediction model developed by Matsumoto and Gray (Colorado State University), and has been implemented into the JTWC combined ARQ procedure. CSUM incorporates climatology, persistence, and the Navy Operational Global Atmospheric Prediction System (NOGAPS) 500 mb height fields to forecast up to 72-hour tropical cyclone movement. In the operation, tropical cyclones are stratified on their position relative to the 500 mb subtropical ridge or their motions to better define the environmental influences on the cyclones. The 72-hour forecast track is segmented into three 24-hour time frames to permit the application of updated persistence and synoptic data relative to the

new cyclone position. Testing of the optional version of the model is now underway.

ENVIRONMENTAL INFLUENCES ON TROPICAL CYCLONE INTENSIFICATION

(Merrill, R. and W. Gray, Colorado State University)

A study examining the observed upper-tropospheric environmental flow difference between intensifying and non-intensifying storms has been completed. Upper-tropospheric wind observations are composited for 28 tropical cyclones according to their intensity tendencies. A rotated coordinate system based on the outflow jet location is used so that the asymetric flow structure is preserved. Little difference is observed in total outflow on the synoptic scale. However, intensifying storms have a less constricted outflow with evidence of lateral connections with the surrounding flow.

EVALUATION OF JTWC OBJECTIVE AIDS

(Tsui, T. and R. Miller, NAVENVPREDRSCHFAC)

Evaluation of all JTWC objective aids is now underway. The complete evaluation of all aids will include 1978-1984 performances. Performances since 1967 will also be investigated; the study however will be limited to those aids existing in the JTWC data file. The evaluation will expand from the forecast error (mean vector error) to cross-track/-along-track errors, track/speed errors and timing errors. In addition, the evaluation will concentrate on the combined performance of the least forecast error distance and the most consistent heading forecast. Statistical tests on the significance of the results will be carried out to clarify the meaning of the performance differences.

NAVY TACTICAL APPLICATIONS GUIDE (NTAG) VOL. 6, PART I:

TROPICAL WEATHER ANALYSIS AND FORECAST APPLICATIONS

(Fett, R., NAVENVPREDRSCHFAC)

Studies were completed for this volume, based largely on Defense Meteorological Satellite Program (DMSP) data. The volume contains a number of new research results including a method of precisely locating the positions of equatorial troughs by satellite. Studies are presently being finalized in preparation for the printing process with anticipated distribution of Vol. 6, Part I, in the autumn of 1986. Additional studies currently under investigation in Vol. 6, Part II, relate exclusively to the tropical cyclone problem and will be published at a later date.

THE ADVANCED TROPICAL CYCLONE MODEL (ATCM)

(Hodur, R., NAVENVPREDRSCHFAC)

The Advanced Tropical Cyclone Model (ATCM) is being developed using the recommendations made at the tropical cyclone workshop held in Monterey, California (January, 1985). First, the Navy Operational Regional Atmospheric Prediction System (NORAPS) is the framework for the ATCM. Second, the ATCM will have a uniform resolution of 80 km or less with at least 10 levels. Third, the domain of the model will cover the entire WESTPAC area. Using this approach, the ATCM will only need to be run once per watch, since all tropical systems can be included in the model domain. This also allows interactions to occur between storms during multiple storm situations.

The current work on the ATCM is geared toward defining the initial conditions of the large-scale flow and the circulation of the tropical cyclone. The large-scale flow will be defined by running the ATCM with an update cycle every watch. This approach has two advantages. First, all features forecast by ATCM are retained from one forecast to the next. Second, the first guess fields will be consistent with the ATCM model equations. Two approaches are being examined for the initial tropical cyclone circulation. The first is to allow the model to develop the storm structure in a no-flow environment, and then to add this circulation into the large-scale flow. The second is to let the model spin-up the tropical cyclone(s) with the large-scale flow using conventional data. Encouraging results were obtained using the latter technique in the western Atlantic, in the fall of 1985.

TROPICAL CYCLONE PREDICTION STUDIES

(Elsberry, R. L., Chan, J. C.-L., and J. E. Peak, NAVPGSCOL)

The performance of tropical cyclone forecast aids under different environmental conditions and for various cyclone characteristics has been studied. Based on a rating system for cross-track and along-track errors, the One-way Tropical Cyclone Model (OTCM) and the Nested Tropical Cyclone Model (NTCM) generally produce the most accurate forecasts at 72-hours. Empirical Orthogonal Function (EOF) analyses of the wind fields around western North Pacific tropical cyclones have been used to derive a statistical-synoptic track prediction scheme. The 72-hour errors are competitive with the JTWC official forecasts. Further improvement is obtained by

stratifying the situations according to past storm motion. A similar improvement can be obtained if the wind-based EOF's are used to stratify the situation. An objective technique has been tested for estimating the warning position of the tropical cyclone from the fixes received during the previous 6-hours. Weighting factors for different observational platforms and for the time of the fix have been incorporated. The objective positions are generally superior to the JTWC operational positions during 1981 and 1982 and are nearly as good as the JTWC during 1983. The causes of the anomalous track guidance received during Super Typhoon Abby (1983) have also been examined. The intensity and enormous circulation of this super typhoon are suggested as the reasons for the failure of the objective aids during a period when Abby was moving almost normal to the steering

THE NAVY TWO-WAY INTERACTIVE NESTED TROPICAL CYCLONE MODEL (NTCM)

(Fiorino, M., NAVENVRSCHPREDFAC)

A new version of the NTCM was tested in a research mode during the 1985 WESTPAC season. This version (NTCM3.0) has three features: 1) One-way influence boundary conditions on the course grid with forcing from the NOCAPS wind forecasts; 2) A vortex and heating specification procedure that insures a more realistic storm evolution; and 3) A pre-forecast modification of the steering flow that accounts for the observed current motion.

The operational version of the NTCM was changed in the early part of the season based on experience with NTCM3.0. The new operational version (NTCM2.2) differs from the 1984 version (NTCM2.1) in that the bias-corrector was activated and a serious program error was corrected, which affected the interaction between the fine and course meshes.

Although the time-dependent boundary version of NTCM3.0 was shown to be superior to its channel model equivalent and to NTCM2.1, the comparisons of NTCM2.2 and NTCM3.0 revealed little advantage to the new version of the model during the 1985 season.

ANNEX A TROPICAL CYCLONE TRACK AND FIX DATA

1. WESTERN NORTH PACIFIC CYCLONE DATA

AVERAGE SPEED OF TROPICAL CYCLONE IS

	* *			
0106002 4.1 155.1 20 0.1 0106002 4.5 155.6 20 0.0 0106122 4.9 155.1 20 0.1 0106132 5.4 154.6 25 0.1 0107002 5.9 154.1 30 5.6 0107002 6.9 154.1 30 5.6 0107102 8.0 152.0 40 7.0 0107182 9.2 150.9 35 9.0 0108002 10.5 149.6 30 10.1 0108002 12.0 148.5 25 11.0 0108122 13.8 147.9 25 13.0 0108182 15.5 148.1 20 14.5	0 0.0 00. 0. 0 0.0 00. 0. 9 154.1 30. 0. 0. 1 153.8 35. 51. 0. 4 152.5 40. 47. 0. 3 150.9 40. 6. 5.	24 HOUR FORECAST POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4B HOUR FORECAST ERRORS DO NO 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST ERRORS 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MGGNITUDE ERRO AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICE	ALL FORECASTS WRNG 24-HR 48- 29. 201. 484 12. 58. 155 OR 1. 25. 40 9 5. 1 AL CYCLONE IS 976. N	HR 72-HR WRNG . 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL STORM ELSIE FIX POSITIONS FOR CYCLONE NO. 1

14. KNOTS

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK COL	DE	COMMENTS		SITE		
1234567	969999 969699 969699 961299 961299 962199 979399	3.81 155.8E 4.41 155.8E 3.41 155.8E 3.61 154.4E 5.61 153.9E 5.61 153.6E	66666666 7777777 7777777 7777777	T0.5/0.5		INIT OBS ULCC FIX ULCC FIX INIT OBS		PGTW PGTW PGTW PGTW PGTW PGTW PGTW		
8 10 11 12 13 * 14	070000 070300 070600 070900 071200 071600 071800 072041	5.8N 154.1E 6.0N 153.5E 6.6N 153.5E 8.5N 152.1E 8.5N 150.7E	PCN 6666 PCN N 6666 PCN N 6666666666666666666666666666666666		/D1.5/27HRS /D1.0/24HRS	ULCC FIX		PGTU PGTU PGTU PGTU PGTU PGTU PGTU PGTU		
156789 120123 120123	972941 980909 980909 980300 980300 980300 980300 981200 98220	3. BN 155. 9E 4.4N 155. 8E 3. 9N 155. 2E 4.6N 154. 4E 5. 0N 152. 9E 5. 6N 153. 9E 6. 0N 152. 3 6. 0N 152. 3 6. 0N 152. 3 6. 0N 153. 3 7 8. 5N 156. 7 8. 5N 156. 7	PCC	T2.0/2.0	/S0.0/22HRS	ULCC FIX ULCC FIX ULCC FIX ULCC FIX		POTU POTU POTU POTU POTU POTU POTU POTU		
					AIRCR	AFT FIXES				
FIX NO.	TIME (2)	POSITION	FLT	700MB 0BS HGT MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL-UND ACCRY DIR/VEL/BRG/RNG NAV/MET	EYE E'SHAPE DI	YE ORIEN- AM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1 2 3	062238 072128 072355	5.8N 154.4E 10.3N 150.4E	1500FT 1500FT 1500FT	5001 6001 6001	25 330 70 30 170 94 30 050 90	050 33 330 70 10 5 230 29 170 94 6 10			+25 +25 +24 28 +23 +25 +34 26 +24 +24 +20 27	1 2 2

SYNOPTIC FIXES

FIX TIME FIX INTENSITY DATA (NM) COMMENTS

* 1 070600 6.0N 154.0E 035 045 91339 91334 91348

TROPICAL STORM FABIAN BEST TRACK DATA

MO/DAGEZ 01/08/06/2 01/08/06/2 01/08/16/2 01/09/06/2 01/09/16/2 01/09/16/2 01/09/16/2 01/09/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16/2 01/16	12.1 134.4 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	POSIT WIND DST 9.0 0.0 00. 9.0 0.0 00. 9.0 0.0 00. 9.0 0.0 00. 9.7 135.0 50. 17.	RORS 10.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5. 210. 15. 10.6 1: 5. 213. 15. 10.6 1: 6. 22. 0. 10.1 1: 6. 68. 0. 11.3 1: 6. 35. 5. 11.0 1: 6. 35. 10. 10.7 1: 6. 32. 10. 10.4 1: 6. 101. 25. 0.0	0.0 00, 0. 0.0 00, 0. 0.0 00, 0. 0.0 00, 0. 35.0 50. 224. 10. 35.0 50. 242. 15. 35.0 50. 251. 15.	72 HOUR FORECAST ERRORS POSIT WIND DST WIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
MISTANCE	CAST POSIT ERROR T ANGLE ERROR NSITY MAGNITUDE ER NSITY BLAS F FORECASTS TRAVELED BY TROP!	16 12. ICAL CYCLONE IS 5		TYPHOONS WIRNG 24-1		

TROPICAL STORM FABIAN FIX POSITIONS FOR CYCLONE NO. 2

FIX NO.	TIME	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	040000			T1.0/1.0	INIT OBS	DOTU
. 12345678901234567890123456789012345678901234567890 111111111111222222222222223333333333344444444	$\begin{array}{c} 0.00000000000000000000000000000000000$	No. No.	######################################	T2.5/2.5 T3.0/3.0 T2.0/2.0 /D1.0/24HRS T1.5/2.5 /W1.0/24HRS T3.0/3.0-/D1.0/24HRS T2.5/2.5 /D1.0/24HRS T2.5/2.5+/W0.5/24HRS T2.5/2.5 T1.5/2.0 /W1.0/24HRS T3.0/3.0 /D0.5/22HRS T2.5/2.5 /S0.0/25HRS	ULCC FIX INIT OBS ULCC FIX INIT OBS ULCC FIX EXP LLCC ULCC 12.5N 127.2E ULCC 11.9N 128.5E ULCC FIX	PEGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
1234567894 1555555555555555	091800 100007 100300 100600 1006031 100900 101247 101840	16.4N 134.4E 9.4N 137.6E 9.3N 137.8E 9.3N 138.8E 9.5N 138.6E 9.5N 138.6E 9.5N 138.7E	54436436 CCCCCCCCC CCCCCCCCCCCCCCCCCCCCCC	T3.0/3.0 /D0.5/24HRS T3.5/3.5 /D0.5/26HRS	EXP LLCC EXP LLCC EXP LLCC EXP LLCC	PGTW PGTW PGTW PGTW PGTW PGTW
60123 6666 6666 6666 6666	102118 110000 110128 110442 110600 110618 110959	9.50 139.1E 9.40 138.6E 9.40 138.5E 9.60 138.4E 9.70 138.7E 9.70 137.9E	222222 222222 222222 22222 22222 2222 2222	T3.0/3.0 /S0.0/24HRS	ULCC 09.2N 136.4E ULCC 09.4N 136.0E	PGTW PGTW PGTW PGTW PGTW PGTW

# 69 111600 9.2N 1 # 70 111727 9.3N 1 # 71 111800 9.3N 1 72 1120107 8.9N 1 74 120107 8.9N 1 75 120431 9.2N 1 76 120605 9.1N 1 77 121717 9.7N 1 79 122036 9.2N 1 80 130047 9.2N 1	4E PCCN G 4 3 4 3 4 9 PCCN S 6 9 PCCN N S 7 9 7 9 7 9 7 9 7 9 7 9 7 9 7 9 7 9 7	T3. 0 /3.5 /W0.5/22HRS F1.5/2.0 /W1.5/25HRS F1.5/1.5 /S0.0/24HRS	ULCC FIX ULCC FIX EXP LLCC EXP LLCC EXP LLCC ULCC FIX EXP LLCC EXP LLCC EXP LLCC EXP LLCC	PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU PGTUU
		AIRCRAFT FIXES		
FIX TIME FIX HO. (2) POSITION	FLT 700MB OBS LVL HGT MSLP	MAX-SFC-UND MAX-FLT-LVL-UND AC VEL/BRG/RNG DIR/VEL/BRG/RNG NAV	CCRY EYE EYE ORIEN-	EYE TEMP (C) MSN OUT/ IN/ DP/SST NO.
1 070142 11. 4N 134 9E 2 099423 10.4N 135 9E 3 0996355 9.9N 135 4E 4 100267 9.9N 137 4E 5 100267 9.9N 138 5E 6 100244 9.4N 138 5E 7 112312 9.6N 138 8E	1500FT 1000 1500FT 989 1500FT 992 1500FT 992 1500FT 992 1500FT 992 1500FT 1000	35 300 45 010 38 240 25 10 240 25 310 6 240 25 10 25 320 50 250 25 25 25 25 45 220 50 250 27 20 15 3 45 220 50 250 27 20 50 50 15 110 50 240 25 25 25 10 25 140 120 250 31 140 120	3 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	+29 +27 +24 3 +24 +28 +25 27 6 +24 +25 +25 28 7 +24 +25 +25 7 +25 +25 8 +25 +25 28 8 +26 10
		SYNOPTIC FIXES		
FIX TIME FIX NO. (Z) POSITION	INTENSITY NEAREST ESTIMATE DATA (NE	COMMENTS		
1 101200 9.9N 138.7E 2 110000 9.9N 138.7E 3 110600 9.7N 138.4E 4 110900 10.0N 138.4E 5 111600 10.0N 138.6E 7 111500 9.6N 138.6E 7 111500 9.6N 139.0E 8 121200 9.6N 139.7E	045 045 045 045 045 035 045 045 045 040 045 045 040 050	91413 91203 91413 91203 91413 91413 91413 91413 91203 91413 91203		

TYPHOON GAY BEST TRACK DATA

BEST TRACK	WARNING ERRORS	24 HOUR FORECAST ERRORS	48 HOUR FORECAST ERRORS	72 HOUR FORECAST ERRORS
9520002 11.5 131.9 30 0.0520002 11.5 132.0 30 0.0520122 11.5 132.0 30 0.0520122 11.5 132.1 35 13.0 0.0 0.0520182 12.3 132.1 35 13.0 0.0 0.0520182 12.3 13.1 132.1 35 13.0 0.0 0.05201602 13.1 13.1 132.1 135 13.0 0.0 0.05201602 13.1 13.1 132.1 135 13.0 0.0 0.05201602 14.5 132.1 135 14.0 0.05201602 14.5 132.1 135 14.0 0.0520182 14.5 132.1 14.5 14.0 0.0520182 14.5 130.2 0.0520182 17.2 130.0 0.0520182 17.2 130.0 0.0520182 17.0 130.0 0.0520182 17.0 130.0 0.0520182 17.0 130.0 0.0520182 17.0 120.0 0.0520182 17.0 120.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0.0520182 17.0 0	POSIT UIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	POSIT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	D POSIT WIND DST WIND 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	FRORS POSIT UIND DST UIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 7.8 128.7 40. 17450. 8.3 128.3 45. 19955. 9.6 128.2 45. 19955. 8.4 128.4 50. 43340. 0.0 128.1 45. 46435.
052600Z 30.3 138.4 60 30 052606Z 30.7 139.8 55 31				6.0 6.0 66. 6. 6.0 6.0 66. 6.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS	ALL FORECASTS WRNG 24-HR 48-HR 17. 112. 259. 9. 55. 79. ROR 5. 13. 252923. 22. 17. 14.	72-HR URNG 371. 17. 65. 9. 43. 5. -432. 8 22.	100NS JHILE OVER 35 KTS 24-HR 48-HR 72-HR 112. 259. 371. 55. 79. 65. 13. 25. 43. -92343. 17. 14. 8	
DISTANCE TRAVELED BY TROPIC				
AVERAGE SPEED OF TROPICAL C	CYCLONE IS. 10. KNOT	TS		

TYPHOON GAY FIX POSITIONS FOR CYCLONE NO. 3

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1274567890112	00000000000000000000000000000000000000	######################################		T1.0/1.0 T1.0/1.0 T1.0/1.0 T2.0/2.0 T2.0/2.0	COMMENTS INIT OBS ULCC FIX INIT OBS ULCC 8.7N 134.9E ULCC FIX ULCC FIX ULCC 8.8N 1324E INIT OBS ULCC 9.0N 133.1E ULCC 9.1N 132.1E ULCC 10.5N 132.2E EXP LLCC ULCC 10.9N 132.6E ULCC 10.9N 131.9E EXP LLCC ULCC 10.9N 131.9E EXP LLCC ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PPGGGGGGM PPGGGGGGGM PPGGGM PPGGM PPGGM PPP PPP
13 14 15 16 17 * 18 * 19	191200 191309 191600 191800 192111 200000 200150	9.0N 131.7E 9.0N 131.7E 9.2N 132.3E 9.1N 132.3E 10.3N 132.8E	0666665	T1.0/1.0+/50.0/22HRS	ULCC 9.1N 132.1E	PGTU RODN PGTU PGTU RODN PGTU RODN
* 21 22	200150 200300 200518	11.5N 132.2E 13.1N 132.9E 12.7N 131.7E	PCN 3 PCN 6 PCN 5	T2.0/2.0 /50.0/20HRS T2.0/2.0 /50.0/24HRS	ULCC 10.5N 132.2E	RPMK PGTU PGTU
* 25 * 25 26 27	200518 200600 200900 200951	12.5N 131.9E 13.0N 131.7E 13.4N 131.8E 12.3N 131.6E	PCN 4 PCN 6 PCN 7	T2.0/2.0 /S0.0/24HRS	EXP LLCC Ulcc 10.9N 132.6E Ulcc 10.9N 131.9E Exp Llcc	RPMK PGTU PGTU RPMK
* 39 * 39 * 31 * 32	201600 201804 201804 202049 202306	12.5N 132.2E 13.1N 133.1E 12.8N 132.5E 12.5N 130.3E 13.4N 131.8E	PC7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	T2.0/2.0-/D1.0/24HRS		PGTU PGTU RODN PGTU RPMK PGU
101101456789011014567890110111111111111111111111111111111111	210000 210000 210000 210507 210500 210929 211003	12.8N 131.9E 13.1N 131.9E 13.0N 131.9E 13.3N 131.9E 13.5N 132.5E 13.4N 132.9E 14.7N 132.0E 14.7N 132.2E	969656665	T2.5/2.5 /D0.5/21HRS T2.5/2.5 /D0.5/24HRS		POTUK POTUK POTUK POTUK POTUK POTUK POTUK POMK
41 42 43 44 45 46 47	211200 211600 211753	14.1N 132.3E 14.5N 132.5E 14.8N 131.9F	PCN 6 PCN 6 PCN 4		ULCC FIX	PGTW PGTW PODN
	211800	14.5N 132.2E 14.7N 131.1E	PCN 6 PCN 5	T2.5/2.5 /D0.5/26HRS T4.0/4.0 /D1.0/21HRS	ULCC FIX	PGTU RODN
49 50	220000	14.4N 132.1E 15.5N 132.0E	PCN 6 PCN 3	T3.0/3.0 /D0.5/24HRS	ULCC FIX	PGTW PGTW Rodn
* * *	220110 220300 220456 220600 220900 220908	14.8N 132.2E 14.8N 132.2E 15.1N 132.1E 15.6N 131.8E 15.9N 131.7E 14.9N 131.8F	PCN 56 PCN 66 PCN 66 PCN 66 PCN 86	T2.5/2.5 /S0.0/24HRS	EXP LLCC ULCC FIX ULCC FIX ULCC FIX	PGTU PGTU PGTU PGTU PDMY
57 58 * 59	220600 220908 220908 220939 221200 221350	15.8N 131.9E 16.1N 131.6E 15.7N 132.2E	PCN 6 PCN 6 PCN 5		ULCC FIX ULCC FIX	PGTU PGTU RPMK

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ULCC FIX
                                                                                                                                           T3.0/3.0 /D0.5/22HRS
                                                                                             ULCC FIX
                                                  T4.0/4.0 /50.0/23HRS
                                                  T4.0/4.0-/D1.0/24HRS
T3.5/3.5-/D1.0/24HRS
                                                                                            ULCC FIX
                                                                                            ULCC FIX
                                                                                             ULCC FIX
RGD EYE
WELL DEFINED EYE
                                                                                            ULCC FIX
                                                  T4.0/4.0 /D1.0/24HRS
                                                  T4.0/4.0 /D0.5/21HRS
                                                                                            60 PCT EYEWALL
EYE FIX
EYE FIX
EYE FIX
EYE FIX
EYE FIX
EYE FIX
                                                  T5.0/5.0-/D1.0/24HRS
T5.0/5.0-/D1.0/27HRS
                                                  T4.5/4.5-/D1.0/29HRS
                                                                                            EYE FIX
ULCC FIX
ULCC FIX
ULCC FIX
ULCC FIX
                                                  T5.0/5.0-/D1.0/24HRS
                                                  T4.0/5.0 /W1.0/24HRS
                                                  T3.5/4.5 /W1.5/24HRS
T3.5/4.5 /W1.0/24HRS
                                                                                            ULCC 25.8N 133.1E
                                                                                             EYEWALL OPN SE-S-SW
                                                                                             ULCC FIX
                                                                                            ULCC FIX
ULCC FIX
ULCC FIX
ULCC FIX LLCC 28.6N 136.6E
                                                  T4.0/5.0 /W1.0/24HRS
                                                                                            EXP LLCC
                                                                                             EXP LLCC
                                                             AIRCRAFT FIXES
```

FIX No.	TIME (Z)	FIX POSITION	FLT	700MB HGT	OBS MSLP	MAX-SFC-UND VEL/BRG/RNG	MAX-FLT-LVL-UND ACCRY DIR/VEL/BRG/RNG NAV/MET	EYE EYE ORIEN- SHAPE DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
1234567899	230830 232103 232311 240548 240818 240859 242334 250901 251139 2511327	18.8h 129.6E 20.1h 128.8E 20.5h 128.7E 21.5h 129.7E 21.9h 129.7E 24.7h 131.9E 27.1h 133.9E 27.0h 135.0E	700MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB	2832 2796 2796 26661 2833 2845 28573 2879	971 957 952 974 979 983	65 030 10 50 030 8 90 280 7 100 250 10 100 330 10 90 220 7 80 300 30 100 270 40	120 72 030 15 4 2 330 86 190 12 4 3 3 3 10 10 10 10 10 10 10 10 10 10 10 10 10	CIRCULAR 15 CIRCULAR 15 CIRCULAR 18 CIRCULAR 13 ELLIPTICAL 20 10 360	+11 +16 + 9 +11 +18 +12 +13 +18 +12 +17 +19 +12 +18 +15 +13 +11 +22 +12 +12 +26 + 7 +11 +16 + 9 + 9 +14 +12 +10 +12 +16	-9000044556

TROPICAL DEPRESSION 04 BEST TRACK DATA

BEST TRACK MO/DA/HR	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	48 HOUR FORECAST POSIT UIND DST UIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.1 106.3 40. 228. 10. 0.0 0.0 00. 0. 0.1 106.1 30.198. 5. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.	72 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CV AVERAGE SPEED OF TROPICAL CVCLOR		72-HR URNG 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 6. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL DEPRESSION TD04W FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION		DVORAK CODE			SITE
12345	170000 170231 170300 170600 171055	16.8N 112.5E 15.9N 112.4E 16.0N 112.4E 16.6N 112.3E 16.1N 112.6E	PCN 4 PCN 3 PCN 4 PCN 6 PCN 5	T1.5/1.5 T1.5/1.5		INIT OBS INIT OBS EXP LLCC EXP LLCC FIX EXP LLCC FIX EXP LLCC INIT OBS ULCC FIX ULCC FIX	PGTW RPMK PGTW PGTW RPMK
* 6 * 7 8 9	171171100210000201109901990000001188800011111771177117711888888888	112. 44 HE	₹774@M@M@@@@M@@@@M@M₹M?@#M@M@@#@## \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$	T1.5/1.5 T1.5/1.5 T2.0/2.0 /D0.5/	/20HRS	INIT OBS INIT OBS ULCC FIX	
01107456789012074567890120745 11111111120222222222222222222222222222	180210 180210 180300 180600 180900	16.4N 110.4E 16.4N 110.4E 16.2N 110.2E 16.4N 109.9E 16.8N 109.7E	PCN 3 PCN 3 PCN 6 PCN 6 PCN 6	T2.5/2.5	L TING	EXP LLCC INIT OBS	RPMK RODN PGTW PGTW PGTW
* 17 * 18 * 19 20	181122 181200 181451 181800	15.9N 108.2E 16.7N 108.6E 16.8N 107.8E 16.2N 110.4E	PCN 6 PCN 6 PCN 5 PCN 6			ULCC FIX ULCC FIX EXP LLCC	RODN PGTW RPMW PGTW
2345	182100 182221 182309 190000	16.8N 110.5E 16.6N 110.4E 16.8N 110.5E 17.0N 110.9E	94 900 900 900 900 900 900	T2.0/2.0 /S0.0/ T1.0/1.0	/20HRS		PGTW RPMK RKSO PGTW
26 28 29 30	190150 190300 190600 190642 190900	17.2N 110.5E 17.1N 110.7E 17.6N 111.0E 16.6N 111.5E 17.7N 111.3E	PCN 6 PCN 6 PCN 5 PCN 6	T2.0/2.5 /W0.5/ T2.5/2.5 /S0.0/	/28HRS		PGTU PGTU PGDN PGTU
31 32 33 * 34	191101 191101 191148 191928	17.2N 111.5E 18.1N 111.1E 17.0N 111.6E 19.4N 109.1E	PCN 4 PCN 5 PCN 3 PCN 4			EXP LLCC	RPMK RODN RPMK RPMK RKSO
36 37 38 39 * 40	200000 200026 200300 200600 200631	19.2N 110.6E 19.2N 110.3E 18.9N 110.2E 19.2N 110.2E	74667666 CCCCCCCCCC PPPPPPPPPPPPPPPPPPPPPP	T1.5/2.0 /W0.5/	/26HRS	EXP LLCC EXP LLCC	PGTW RPMK PGTW PGTW RKSO
					SYNOPTIC FI	XES	
FIX NO.	TIME (Z)	FIX POSITION	INTENSIT ESTIMATE	Y NEAREST DATA (NM)		COMMENTS	
1 2 3 4	170600 170900 171200 171800	16.0N 112.0E 16.2N 111.8E 16.3N 111.3E 16.5N 111.0E	929 929 939	030 015 015 045	59985 59981 59985 59981 59985 59981 59985 59981		

TYPHOON HAL BEST TRACK DATA

BEST TRACK	WARNING 24	HOUR FORECAST 48 HOUR FORECAST	72 HOUR FORECAST
061912Z 14.3 132.5 30 0.0 0.0 601918Z 14.5 131.5 35 14.5 14.5 14.5 16.6 2000Z 18.1 129.8 65 15.4 129.8 66200Z 15.1 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 65 15.4 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8 129.8	0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	POSIT UIND DST UIND 05 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY HAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	ALL FORECASTS URNG 24-HR 48-HR 72-HR 15. 137. 380. 630. 11. 109. 347. 591. 4. 13. 17. 1715. 5. 10. 22 19 13 11	TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 15- 142- 380- 586- 11- 112- 347- 490- 4- 15- 17- 16- 7- 13- 9	
DISTANCE TRAVELED BY TROPICAL C	YCLONE IS 1305. NM		
AVERAGE SPEED OF TROPICAL CYCLO	NE IS 9. KNOTS		

TYPHOON HAL FIX POSITIONS FOR CYCLONE NO. 5

FIX TIME FIX NO. (Z) POSITION ACCRY DVORAK CODE	COMMENTS	SITE
1 131800 5.5N 151.5E PCN 6 T0.0/0.0 2 132100 5.3N 151.1E PCN 6 3 140000 4.5N 151.7E PCN 6	INIT OBS	PGTW PGTW PGTW
4 140300 4.8N 151.4E PCN 6 5 140600 5.2N 150.8E PCN 6 T1.0/1.0 6 140900 5.1N 151.0E PCN 6 7 141200 4.4N 147.4E PCN 6	INIT OBS	PĞTÜ PĞTÜ PĞTU PĞTU
8 141600 3.3N 147.4E PCN 6 * 9 150000 5.8N 140.8E PCN 6 * 10 150130 17.3N 137.5E PCN 5 * 11 150543 5.1N 140.4E PCN 5	ULCC FIX ULCC FIX INIT OBS	PGTW PGTW PGTW RPMK RPMK
12 160000 6.3N 146.9E PCN 6 T1.0/1.0 /50.0/24HRS 13 160900 8.1N 144.3E PCN 6 14 161200 7.1N 144.2E PCN 6 15 170900 11.0N 139.7F PCN 6	ULCC FIX	PGTU PGTU PGTU
16 171200 10.3N 139.7E PCN 6 T1.0/1.0 17 171600 10.6N 139.4E PCN 6 18 171800 11.0N 139.0E PCN 6 19 172100 11.4N 139.1F PCN 6	INIT OBS ULCC FIX ULCC FIX ULCC FIX	PGTU PGTU PGTU PGTU
20 180028 12.4N 139.1E PCN 5 T1.5/1.5 21 180600 12.6N 138.4E PCN 6 T1.0/1.0 22 180941 13.7N 139.1E PCN 5 23 181309 12.8N 138.3E PCN 5	INIT OBS	RODN PGTW RODN
24 181600 13.4N 136.1E PCN 6 T2.0/2.0 /D1.0/28HRS 25 182040 12.6N 137.0E PCN 6 26 182100 15.9N 135.9E PCN 6 27 182128 15.8N 136.1F PCN 6	ULCC FIX	PGTW RPMK PGTW
14 161200 7.1N 144.ZĒ PCN 6 15 170900 11.0N 139.7E PCN 6 16 171200 10.3N 139.7E PCN 6 17 171600 10.6N 139.4E PCN 6 18 171800 11.0N 139.0E PCN 6 19 172100 11.4N 139.1E PCN 6 20 180028 12.4N 139.1E PCN 6 21 180600 12.6N 138.4E PCN 6 22 180941 13.7N 139.1E PCN 5 23 181309 12.8N 138.3E PCN 5 24 181600 13.4N 136.1E PCN 6 25 182040 12.6N 137.0E PCN 6 26 182100 15.9N 135.9E PCN 6 27 182128 15.8N 136.1E PCN 6 28 190008 16.3N 134.4E PCN 6 29 190008 16.3N 134.4E PCN 6 28 190008 16.3N 134.4E PCN 6 29 190008 16.3N 134.4E PCN 6 20 190008 16.3N 134.4E PCN 6 21 190008 16.3N 134.4E PCN 6 22 180000 13.4N 133.5E PCN 6 23 191000 13.5N 132.5E PCN 6 24 181600 13.9N 132.3E PCN 6 25 181600 13.7N 132.3E PCN 6 26 181746 14.0N 132.3E PCN 6 27 181818 1818 1818 1818 1818 1818 1818		PGTW RODN PGTW PGTW
32 190920 14.0N 133.2E PCN 5 33 191007 14.0N 132.6E PCN 6 34 191200 13.9N 132.3E PCN 6 35 191600 13.7N 132.3E PCN 6 T2.5/2.5+/D0.5/24HRS	ULCC FIX PSBL SCHDRY 14.3N 132.8E	RODN PGTW PGTW PGTW
* 37 192100 15:1N 132.3E PCN 5 * 37 192100 15:1N 132.3E PCN 6 38 192245 15:0N 131.1E PCN 5 39 200000 14:5N 130.9E PCN 6 49 200100 14:5N 130.9E PCN 6	olec Fix	PGTW PGTW PGTW
* 41 200300 15.9N 130.2E PCN 4 T3.0/3.0 /D1.0/21HRS 42 200449 14.9N 130.5E PCN 5 43 200600 15.5N 129.9E PCN 6 44 200900 15.7N 129.9E PCN 6	EXP LLCC	PGTW PGTW PGTW
45 201200 15.7N 129.2E PCN 6 46 201410 15.7N 129.5E PCN 4 47 201735 16.2N 128.2E PCN 5 48 201800 16.2N 128.3F PCN 5 T3 5/3 5 /D1 0/26HPS		PGTW RODN RPMK
43 200600 15.5N 129.9E PCN 6 44 200900 15.7N 129.9E PCN 6 45 201200 15.7N 129.2E PCN 6 46 201410 15.7N 129.2E PCN 6 47 201735 16.2N 128.2E PCN 4 48 201800 16.2N 128.3E PCN 4 49 202100 16.2N 128.3E PCN 4 51 210100 16.6N 126.6E PCN 4 51 210100 16.6N 126.6E PCN 4 52 210109 16.8N 126.0E PCN 4 53 210300 16.5N 125.7E PCN 4 54 210600 16.5N 125.7E PCN 4 55 210621 16.7N 125.9E PCN 4 55 210621 17.4N 125.3E PCN 4 56 210621 17.4N 125.3E PCN 4 57 211019 18.0N 125.0E PCN 1 58 211059 18.1N 124.8E PCN 3 59 211100 16.8N 124.8E PCN 3 60 211200 17.8N 124.2E PCN 4 59 211100 16.8N 124.8E PCN 3 60 211200 17.8N 124.2E PCN 4	ULCC FIX	ECUPA
53 210300 16.6N 126.2E PCN 4 T4.0/4.0 /D1.0/24HRS 54 210600 16.5N 125.7E PCN 4 55 210621 16.7N 125.9E PCN 3 T5.0/5.0 * 56 210621 17.4N 125.3E PCN 1 T4.5/4.5	INIT OBS	PGTW PGTW RPMK
FIX TIME NO. (2) POSITION ACCRY DVORAK CODE 1 131800 5.5N 151.5E PCN 6 T0.0/0.0 2 132100 5.3N 151.1E PCN 6 T0.0/0.0 3 140000 4.5N 151.7E PCN 6 T1.0/1.0 4 140300 4.5N 151.7E PCN 6 T1.0/1.0 5 140500 5.2N 150.8E PCN 6 T1.0/1.0 8 1416200 3.3N 147.4E PCN 6 T1.0/1.0 8 1416200 3.3N 147.4E PCN 6 T1.0/1.0 8 150130 17.3N 137.5E PCN 5 T1.0/1.0 * 10 150130 17.3N 137.5E PCN 5 T1.0/1.0 * 11 150543 5.1N 140.4E PCN 6 T1.0/1.0 16 16 171200 1.0 3N 139.7E PCN 6 T1.0/1.0 17 171600 8.3N 144.3E PCN 6 T1.0/1.0 17 171600 10.5N 139.7E PCN 6 T1.0/1.0 18 171800 11.0N 139.7E PCN 6 T1.0/1.0 19 172100 11.0N 139.7E PCN 6 T1.0/1.0 19 172100 11.0N 139.7E PCN 6 T1.0/1.0 19 172100 11.0N 139.0E PCN 6 T1.0/1.0 23 181309 12.8N 138.3E PCN 6 T1.0/1.0 24 181600 13.4N 139.1E PCN 6 T1.0/1.0 25 182040 12.6N 139.1E PCN 6 T1.0/1.0 26 18 120941 13.7N 139.4E PCN 6 T1.0/1.0 27 1801628 13.4N 139.1E PCN 6 T1.0/1.0 28 181600 13.4N 139.1E PCN 6 T1.0/1.0 29 190000 13.4N 139.5E PCN 6 T2.0/2.0 /D1.0/28HRS 29 190000 13.4N 133.5E PCN 6 T2.0/2.0 /D1.0/28HRS 29 190000 13.4N 133.5E PCN 6 T2.0/2.0 /D1.0/24HRS 20 190000 13.4N 133.5E PCN 6 T2.0/2.0 /D1.0/24HRS 21 190900 13.6N 132.0E PCN 6 T2.0/2.0 /D1.0/24HRS 21 190900 15.7N 129.9E PCN 6 T2.0/2.0 /D1.0/24HRS 21 190900 15.7N 129.9E PCN 6 T2.0/2.0 /D1.0/25HRS 21 190900 15.7N 129.9E PCN 6 T2.0/2.0 /D1.0/25HRS 22 10100 15.1N 132.6E PCN 6 T2.0/2.0 /D1.0/25HRS 23 210100 15.7N 129.9E PCN 6 T2.0/2.0 /D1.0/25HRS 24 201100 16.6N 126.6E PCN 4 T4.0/4.0 /D1.0/24HRS 25 210100 16.6N 126.6E PCN 4 T4.0/4.0 /D1.0/24HRS 25 210100 16.6N 126.6E PCN 4 T4.0/4.0 /D1.0/24HRS 25 210100 16.6N 126.6E PCN 6 T2.0/5.0 /D1.0/24HRS 25 210100 16.6N 126.6E PCN 6 T2.0/5.0 /D1.0/24HRS 25 210100 16.6N 126.6E PCN 7 T4.5/4.5 /D1.5/24HRS 25 210100 16.6N 126.6E PCN 7		RODN RKSO RPMK PGTW PGTW

45678501234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012040000000000000000000000000000000000	21200237611		20131-1000990009999878777666665556666555555555555555555	######################################	T: T	5555 5 41556 6 4 1 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5		> / D	0.55.5.7.7.7.8.8.8.8.8.8.8.8.8.8.8.8.8.8.	/15HF /25HF /26HF /26HF /28HF /28HF /26HF /27HF /27HF /23HF /23HF /23HF /23HF /23HF /24HF	RSS RS			LOPEGELL R E LL Y LLEGL	D F CC F	WITHIN VE IX VIX VIX VIX VIX VIX VIX	EYE					DITSSTIDMITTATITTIMSTIDMIMSTITATISTITATISTICATIALIANIA SITUMITATIONA SITUMIMATA SITUMIMA SITU	UNITERATE OF OTTOUTE AT A PERONENTE ONE TEONET ONE TO SERVE TO SER
FIX	 .							AIRC	RAFT	FIVE													
NO.	ŢĬĶΕ	FIX	FLT	700MB	OBS	MAX	(~SFC	- U ND	Me	X-FLT	-LVL-	WND	ACCR	84		YE	EVE -	ORIEN-		/F TE	MP 10		SN.
1234567890112	(2)	FIX POSITION 15.2N 129.8E 15.2N 129.8E 15.6N 129.8E 16.6N 127.3E 16.6N 127.3E 16.6N 127.3E 19.6N 121.6E 19.6N 121.6E 19.1N 121.6E 19.1N 121.4E 19.1N 121.4E 19.4N 118.8E	LVL	7 H G T 7 44 7 8 8 2 2 7 7 3 2 2 7 7 6 8 9 2 2 7 7 8 8 9 2 2 7 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	08S MSLP 984 979 976 969 964 961	VEL 69 69 69	100 080 080 123 123 030 040 280 030	130	MAR DIF 1860 1860 1560 1560 1740 2740 2740	X-FLE 508544 60 6634 60 69 7555 60 69 776 60 69 776	-LVL- /BRG/	RNG 1	1AV/M 588880 1050	E 43422275388	CIRC	YE HAPE CULAR CENTRIC	80	ORIEN- TATION	+256555322 +256553222 +11222 +11222 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122 +1122	+25 +26 +16 +16 +10	MD 255952002234 ++++++++++++		SO 455778899900111
123456789012	23135 192615 19068517 20088517 2008930 2011293 2011293 20112984 20112984 20112984 20112984 20112984	POSITION 15.0H 130.7E 15.2N 129.8E 15.0H 129.8E 16.0H 127.3E 16.2N 162.8E 17.0H 125.3E 17.0H 125.3E 17.0H 125.3E 19.0H 121.4E 19.0H 121.4E 19.0H 121.4E	1500FT 15000FT 15000FT 700MB 700MB 700MB 700MB 700MB 700MB 700MB	RGT 7 281247 227738 227668 22869	984 979 976 969 964	VEL 55555656656 655656	7 BR 0 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1600 1050 1050 1050 1050 1050 1050 1050	MO	X-FLE 508544 60 6634 60 69 7555 60 69 776 60 69 776	10000000000000000000000000000000000000	RNG 1	1AV/M 588880 1950 1950 1	1E 494020753885	CIRC	OLAR CULAR CENTRIC	80		+25 +25 +26 +15 +15 +13	+25566607798798 ++121798798	455952002234 +++++++++		4557788999011

29456789012945678901294567890129456789	2311800 2311800 2311800 2311400 2311400 2311800 231700 231700 231700 231800 231700 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231800 231	20.88 115.4E 88 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E 80.31 115.4E	LARADA LA		31942 73008 31914 77500 31914 77500 10912 52706 70914 72500 70914 72500 70914 72500 70914 72500 70914 72500 70917 72500 70917 72500 70917 72500 70917 72500 70917 72500 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 73006 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918 70918	22. 3N 114 . 2EEE 23N 114 . 2EEEE 23N 114 . 2EEEE 23N 114 . 2EEEE 23N 114 . 2EEE 23N 114 . 2EEE	450056545456055555065555665555665555665556655566555665556655566555665556655566555665556655566555665556655566555665556655566556655566555665556655566555665556655566555665556655566655665566556655665566556655665566556655665566556655665566556655665566556655665566556655665566556655665566556655665566565
FIX NO.	TIME (2)	FIX POSITION	INTENSITY ESTIMATE	NEAREST	COMMENTS		
1 2 3	240900 241200 241500 241800	23.0N 115.2E 23.2N 115.1E 23.8N 115.2E 23.9N 114.7E	040 030 030 060	018 030 045 040	59501 59293 59117 45005 59501 59293 59117 45005 59501 59293 59117 45005 59501 59293 59117 45005		



BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST ERRORS
9624122 8.1 134.9 30 0.6 9624122 8.1 134.9 30 0.6 9625002 9.4 134.0 40 9.8 9625002 9.4 134.0 40 9.8 9625002 9.4 134.2 5 50 10.6 9625132 10.4 132.5 55 11.3 9626002 11.5 131.5 66 11.5 6626002 11.5 131.5 66 11.5 6626002 11.5 131.0 6 60 12.2 9626002 12.3 131.0 6 60 12.2 9626002 12.3 131.0 6 60 13.2 9626002 12.3 130.0 6 60 14.8 9627002 14.9 130.2 66 14.8 9627002 15.8 130.2 66 15.5 15.7 962626132 17.7 75 16.7 962626132 17.7 75 16.7 962626132 17.7 75 18.7 962626132 17.7 75 12.9 6 75 17.8 12.9 9 80 22.3 9626132 22.3 130.0 9 80 22.4 3 96262132 22.4 130.0 12.9 9 80 22.4 3 96262132 22.4 130.0 12.9 9 80 22.4 3 96262132 22.4 130.0 12.9 9 80 22.4 3 96262132 22.4 131.5 12.9 9 80 22.4 3 96262132 22.4 131.5 12.9 9 80 22.4 3 96262132 22.4 131.5 5 85 22.3 963002 23.4 131.5 5 85 28.5 9 9630132 23.4 131.5 5 66 37.9 9630132 23.4 131.5 5 66 37.9 9630132 23.4 131.5 5 66 37.9 9630132 23.4 131.5 5 66 37.9 9630132 23.4 135.5 6 66 37.9 9630132 23.4 135.5 6 66 37.9 9630132 32.4 135.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 6 66 37.9 9630132 34.8 138.5 7 66 37.9 9630132 34.8 138.5 7 66 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 135.5 6 60 37.9 9630132 37.4 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 60 37.9 9630132 37.9 142.5 6 6	0.0 0 -0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5.9 124.1 90 341. 25. 68.8 123.9 95. 391. 20. 88.2 121.3 85. 475. 10. 7. 0. 126.2 70 2275. 0. 19030. 89. 2121.5 10. 70. 20. 190. 190. 190. 190. 190. 190. 190. 19	
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROF AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYC	0. 33. 26 22 18 . CYCLONE IS 2413. NM	72-HR URNG 416. 15. 273. 11. 15. 19. 0. 14 26	ONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 120. 216. 416. 71. 173. 273. 6. 13. 15. 339. 22. 18. 14	

TYPHOON IRMA FIX POSITIONS FOR CYCLONE NO. 6

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
		No. No.	GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	DVORAK CODE T1.0/1.0 T1.5/1.5 T1.0/1.0 T2.0/2.0+/D1.0/21HRS T3.0/3.0 T2.5/2.5 /D1.0/21HRS T3.0/3.0 /D0.1/24HRS T3.0/3.0 /D0.5/24HRS T3.0/3.0 /D0.5/24HRS T3.0/3.0 /D0.5/24HRS	COMMENTS INIT OBS ULCC FIX ULCC FIX INIT OBS ULCC FIX INIT OBS ULCC FIX EYE FIX	######################################
441234567859012345	1430000112001120011200112001120011200112	14.7N 130.5E 14.7N 130.5E 14.7N 130.5E 15.0N 130.0E 15.0N 130.0E 15.0N 130.0E 15.2N 130.0E 15.2N 130.0E 15.2N 130.0E 15.2N 130.0E 15.2N 130.0E 15.2N 130.0E 15.2N 130.0E	+ G G D M G D + G M M M A A M A A A A A A A A A A A A A	T4.0/4.0 /D1.0/24HRS T4.0/4.0 /D0.5/26HRS T4.0/4.0 /D1.0/24HRS	EYE FIX EYE FIX EYE FIX EYE FIX ULCC FIX EYEWALL 30 NM DIA	PGTU PGTUN PGTUN PGTUN PGTUN PGTUN RPMTUN RPMTUN PGTUN PGTUN PGTUN

56 271801 17 7N 1229 9EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	PÓN É PCN É PCN 5 PCN 6 PCN 1 PCN 1 PCN 6 PCN 6 PCN 6 PCN 2 PCN 2 PCN 4 PCN 4	EYE FIX EYE
FIX TIME FIX FLT NO. (Z) POSITION LVL	700MB OBS MAX-SFC-WND MAX-FLT-LVL-WND ACCR HGT MSLP VEL/BRG/RNG DIR/VEL/BRG/RNG NAV/MI	T SHAPE DIAM/TATION OUT/ IN/ DP/SST NO.
1 200722 5. SN 148.6E 1500FT 2 250516 9. SN 133.1E 700MB 3 252049 11.2N 131.7E 700MB 4 252335 11. SN 131.5E 700MB 5 260552 12.4N 131.08 E 1500FT 7 262035 14. SN 130.4E 700MB 8 262339 14. SN 130.4E 700MB 8 262339 14. SN 130.4E 700MB 10 270638 16. 2N 129.6E 700MB 11 272045 16. SN 129.5E 700MB 11 272045 20. SN 129.5E 700MB 12 220340 20. SN 130.0E 700MB 13 220340 24. 2N 130.0E 700MB 15 232340 24. 2N 130.0E 700MB 16 232340 24. 2N 130.0E 700MB 17 230530 25. SN 130.0E 700MB 17 230530 25. SN 130.0E 700MB 18 230300 25. SN 130.0E 700MB 19 232340 24. 2N 130.0E 700MB 19 232034 28. SN 130.2E 700MB 19 232034 28. SN 130.2E 700MB 20 232034 28. SN 130.2E 700MB 20 232034 28. SN 130.2E 700MB 20 232034 39. SN 130.2E 700MB 22 300817 31. SN 134.1E 700MB 22 300817 31.	1002 25 010 10 090 15 010 30 5 1 30 37 30 36 9 1 45 200 30 090 37 330 35 10 1 30 47 30 36 9 1 45 200 30 090 37 330 35 8 1 30 47 994 90 160 57 230 53 150 57 3 992 40 040 45 150 61 040 45 5 991 55 110 54 190 55 110 60 5 110 60 5 110 60 5 110 60 5 110 60 5 110 60 5 110 60 5 110 60 5 110 60 5 100 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60 150 60	#15 +15 +18 3 3 4 12 +15 +18 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
·	ŘADAR FIXES	
FIX TIME FIX NO. (Z) POSITION RADAR		COMMENTS RADAR SITE NO NO NO
1 282300 24.1N 130.2E LAND 2 2390800 24.4N 130.2E LAND 3 2390200 24.9N 130.2E LAND 4 239300 25.1N 130.2E LAND 5 290400 25.1N 130.2E LAND 6 290500 25.6N 130.2E LAND 7 2390500 25.6N 130.2E LAND 8 2390500 25.6N 130.2E LAND 10 2390500 25.6N 130.2E LAND 11 2390500 25.5N 130.2E LAND 12 2390500 26.6N 130.2E LAND 13 2390500 26.6N 130.2E LAND 14 231000 26.7N 130.4E LAND 15 231200 26.6N 130.4E LAND 16 231200 26.6N 130.4E LAND 17 231200 26.6N 130.5E LAND 18 231300 27.7N 130.5E LAND 19 231300 27.7N 130.6E LAND 20 231400 27.7N 130.6E LAND 21 231500 27.7N 130.6E LAND 22 231500 27.7N 130.6E LAND 23 231500 27.7N 130.6E LAND 24 231500 27.7N 130.6E LAND 25 231400 27.7N 130.6E LAND 26 231400 27.7N 130.6E LAND 27 291500 27.7N 130.6E LAND 28 291500 27.7N 130.6E LAND 29 291500 27.7N 130.6E LAND 20 291500 27.7N 130.6E LAND 21 231500 27.7N 130.6E LAND 22 231500 27.7N 130.6E LAND 23 231700 28.7N 130.9E LAND 24 231800 28.7N 130.9E LAND 25 231900 28.7N 130.9E LAND 26 222000 28.7N 130.9E LAND 26 232000 28.7N 130.6E LAND 27 232000 28.7N 130.6E LAND 28 2320100 28.7N 130.6E LAND 28 2320100 28.7N 130.6E LAND 29 2320100 28.7N 130.6E LAND 20 232000 28.7N 130.6E LAND 20 232000 28.7N 130.6E LAND 25 232000 28.7N 130.6E LAND 26 232000 28.7N 130.6E LAND 27 2320000 28.7N 130.6E LAND 28 2320100 28.7N 130.6E LAND 28 2320100 28.7N 130.6E LAND 29 232000 28.7N 130.6E LAND 20 232000 28.7N 130.6E LAND	65//3 53616 654/73 53616 54973 53616 54912 53616 54912 53616 10933 53311 11933 53311 11933 53608 52912 53614 10912 53614 10912 50411 10912 53611 51912 53611 10912 53611 10912 53611 10912 53611 10912 53611	26. 2N 127.8E 47937 28. 4N 129.5E 47939

33	592566	29.2N 131.5E	LAND		21912 50314	30.6N 131.0E	47869
34	898300	29.2N 131.7E	LAND		21912 50314 55911 50711	28.4N 129.5E	47909
35	292300	29.1N 131.5E	LAND	/		31.3N 131.9E	
36	595366	29.4N 131.6E	LAND		10722 50314	30.6N 131.0E	47869
37	300000	29.3N 131.9E	LAND		65941 50711	28.4N 129.5E	47909
38	300000	29 5N 131 8E	LAND		20612 50514	30.6N 131.0E	47869
39	300100	29.4N 132.1E	LAND		65941 50413	28.4N 129.5E	47909
40	300100	29.8N 132.0E	LAND		11512 50316	30.6N 131.0E 31.3N 131.9E	47869
41	300200	29 5N 132 SE	LAND	/		31.3N 131.9E	
42	300200	30.0N 132.3E	LAND		51962 50522 55/62 50422	30.6N 131.0E	47869
43	300300	30.3N 132.5E	LAND		55/62 50422	30.6N 131.0E	47869
44	300400	30.2N 132.4E	LAND LAND LAND LAND	/		31.3N 131.9E	
45	300400	30.4N 132.7E	LAND		65/42:50416	30.6N 131.0E 31.3N 131.9E	47869
46	300500	30.3N 132.5E	LAND	/		31.3N 131.9E	
47	300500	30.8N 133.0E	LAND		65/42 50424	30.6N 131.0E 31.3N 131.9E	47869
48	300600	30.5N 133.1E	LAND	_	65/// 50622	31.3N 131.9E	47869
49	300600 300700	30.9N 133.4E	LAND		65/// 50722	30.6N 131.0E 30.6N 131.0E	47869
50 51	300700	31.0N 133.8E 31.1N 133.7E	LAND LAND		55/// /////	30.60 131.66	47899
57	300715	31.0N 133.3E	LAND	,	55/// /////	33.3N 134.2E 31.3N 131.9E	4/699
52 53	300800	31.0N 134.1E	LAND	•	65/// 50816	31.31 131.9E	47869
54	300800	31.1N 134.0E	LAND	,	63/// 36818	30.6N 131.0E 31.3N 131.9E 33.3N 134.2E	7/003
55	300800	31.3N 133.9E	LAND	•	55//2 50524	33 3N 134 2F	47899
22	300900	31.4N 134.2E	LAND	/	33 , 2 00327	31.3N 131.9F	
56 57	300900	31.6N 134.4E	LAND	-	55//2 50524	33.3N 134.2E	47899
ŠĖ	301000	31.6N 134.5E	LAND	/		31.3N 131.9E 33.3N 134.2E 31.3N 131.9E 33.3N 134.2E	
59	301000	31.9N 134.7E	LAND		55//2 50422	33.3N 134.2E	47899
ĕĕ.	301100	31.9N 135.0E	LAND		75//4 50516	35.3N 138.7F	47639
6i	301100	32.2N 135.1E	LAND		55//2 50624	33.3N 134.2E 35.3N 138.7E	47899
62	301200	32.3N 135.3E	LAND		65//4 50632	35.3N 138.7E	47639
63	301200	32.5N 135.4E	LAND		55//2 50427	33.3N 134.2E	47899
64	301300	38.9N 135.8E	LAND		65//4 50338	33.3N 134.2E 35.3N 138.7E 33.3N 134.2E 35.3N 138.7E	47639
65	301300	32.8N 135.9E	LAND		55//2 50527	33.3N 134.2E	47899
- 66	301400	33.0N 136.3E	LAND		65//3 50630	35.3N 138.7E	47639
67	301400	33.1N 136.3E	LAND		55/// 50527	33.3N 134.2E 33.6N 135.8E 35.3N 138.7E	47899
68	301500	33.5N 136.7E	LAND	/		33.6N 135.8E	
69 70	301500	33.7N 136.6E	LAND		65//3 50427	35.3N 138.7E	47639
70	301600	33.5N 136.9E	LAND		6///4 50622	35.3N 138.7E 33.6N 135.8E	47639
71	301700	34.1N 138.2E	LAND		30941 50638	33.6N 135.8E	47639
72	301700	34.2N 138.1E	LAND		6//4 50443	35.3N 138.7E 35.3N 138.7E	47639
73	301800	34.9N 138.6E	LAND LAND		6///3 50643	35.3N 138.7E	47639
74	301900 302000	35.3N 139.6E 35.8N 140.1E	LAND		6///3 50549	35 3N 130 7E	47639
75 76	302100	36.6N 140.6E	LAND		//// ////	35.3N 138.7E 37.7N 138.8E	47572
77	302100	36.2N 140.9E	LAND		6///3 50649	35.3N 138.7F	47639
78	305500	36.6N 141.6E	LAND		6///3 50543	35.3N 138.7E 35.3N 138.7E	47639
79	302300	37.1N 142.3E	LAND		6//// 50546	35.3N 138.7E 38.3N 140.9E 35.3N 138.7E	47639
80	302300	37.6N 141.9E	LAND		65/// 50450	38.3N 140.9E	47590
81	010000	38.2N 142.8E	LAND		6//// 50365	35.3N 138.7E	47639
* BŽ	010000	38.8N 142.2E	LAND		65/// 50455	38.3N 140.9E	47590
¥ 83	010100	39.5N 142.3E	LAND LAND LAND LAND LAND LAND LAND LAND		65/// 50255	38.3N 140.9E	47590

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON JEFF BEST TRACK DATA

BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST
972239622 223.3 145.8 266.6 66.5 114.4 4 9 9 124.2 283.1 144.5 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282.2 282	0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERRORS UINI DST UIND 0 0 0 -C. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	POSIT UIND DET UIND D
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	ALL FORECASTS UNNG 24-HR 48-HR 72-1 18. 132. 342. 639. 13. 80. 170. 345. 4. 9. 14. 292. 1. 6. 7. 40 30 21 13	HR WRNG 24 2. 19. 130. 13. 85. 4. 9. -20.	283. 439.	
DISTANCE TRAVELED BY TROPICAL C	YCLONE IS 2668. NM			
AVERAGE SPEED OF TROPICAL CYCLO	NE IS 9. KNOTS			

TYPHOON JEFF FIX POSITIONS FOR CYCLONE NO. 7

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
* 1 * 2 * 3	202100 202327 210000	18.1N 149.6E 18.4N 150.5E 18.4N 150.7E	PCN 6 PCN 5 PCN 6	T2.0/2.0	INIT OBS	PGTW PGTW
* 4 * 5 * 6	210300 210420 210600	19.2N 150.0E 19.9N 149.2E 20.2N 149.3E	PCN 6 PCN 5 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW PGTW PGTW
* 7 8 9 10	210906 211208 211600	20.2N 142 RF	PCN 6 PCN 6 PCN 6		ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW PGTW
* 12 13	211706 212047 212100	20.7N 146.7E 21.4N 146.6E 20.8N 146.9E 21.8N 145.9E 20.8N 145.8E 20.8N 146.9E 20.2N 146.9E	PCN 6 PCN 6 PCN 6	T2.0/2.0 /S0.0/16HRS	ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW PGTW PGTW
* 14	212145 220000 220049	22.4N 146.0E 22.5N 145.6E	PCN 5 PCN 6 PCN 5		OLOO FIA	PGTW
17 18 19	220300 220600 220927 221025	23.4N 146.6E 23.2N 145.3E 23.5N 145.0E 23.5N 144.8E	PCN 4 PCN 6 PCN 6 PCN 6	T2.5/2.5 /D1.0/24HRS	EXP LLCC	PGTW PGTW PGTW PGTW
21	221200 221329 221600	23.6N 144.6E 23.5N 145.0E 23.5N 144.4E	PCN 6 PCN 6 PCN 6	T2.0/2.0+/S0.0/24HRS	ULCC 23.5N 145.2E	PGTW PGTW PGTW
24 25 26	221655 221800 222025	23.7N 144.2E	PCN 6 PCN 6 PCN 6			PĞTW PGTW PGTW PGTW
58	222304 222305 230000 230359	23.4N 145.5E 23.9N 145.2E 23.5N 145.2E 23.5N 145.2E 23.5N 145.2E 24.5N 145.8E	PCN 5 PCN 5 PCN 6 PCN 5	T2.5/2.5	INIT OBS	RODN PGTU
31 32 33	230600 230905 231003	24.5N 146.2E	PCN 6 PCN 6 PCN 6	T3.5/3.5 /D1.0/24HRS	ULAC 25.6N 146.5E	PGTU PGTU PGTU PGTU PGTU
11111000000000000000000000000000000000	231200 231309 231600	25.5N 146.9E 25.8N 146.8E 25.9N 147.2E 26.2N 147.5E	PCN 6 PCN 6 PCN 6		DERV 63.0N 146.5E	PGTW PGTW PGTW PGTW
37	231644	25.8N 147.6E	PCN 6		ULCC FIX	PGTW

			to the fitting of the fit		
231800 232004 39 232242 342242	26 3N 147 7F	PCN 6 PCN 6	T3.5/3.5 /D1.5/26HRS	ULAC 26.3N 147.9E EXP LLCC ULAC 27.0N 147.4E EXP LLCC ULAC 27.1N 148.0E EXP LLCC ULAC 28.0N 148.0E	P0 P0 P0 P0
11 240008 12 240347 13 240600 14 240900	TREST TRES	PCN 4 PCN 4	T2.5/3.0-/W1.0/24HRS	EXP LLCC ULAC 27.1N 148.0E EXP LLCC ULAC 28.0N 148.0E	PO
14 240900 15 240941	28.1N 147.8E	PCN 6 PCN 6		ULCC FIX	PO
46 241200 47 241248 48 241600	28.3N 147.8E	PCN 6 PCN 6 PCN 6		ULCC FIX	PO
48 241600	28.3N 147.0E	PCN 6 PCN 4	T2.5/3.5 /W1.0/22HRS	ULCC FIX	RK PG PG
49 241634 50 241800 51 241943	29.2N 146.6E	PCN 6			PG
242100	28 5N 145 3E	PCN 6 PCN 3 PCN 3		PSBL EXP LLCC EXP LLCC INIT OBS EXP LLCC	PG PG
4 242347 5 242348	28.0N 144.8E	PCN 3	T1.5/1.5	INIT OBS	RO PO
6 250000 7 250337	28.0N 144.8E 28.3N 144.8E	PCN 4	T2.5/2.5-/S0.0/24HRS	2.11 2200	PO PO
8 250600 9 250823 0 250900	28.3N 144.5E 28.0N 144.4E	PCN 6 PCN 6			PO
0 250900 1 250919	27.9N 144.3E 28.3N 144.1E	PCN 6			P)
51 250919 52 251200 53 251228 54 251228 55 251600	28.5N 143.9E 27.9N 142.5E	PCN 6 PCN 3 PCN 5 PCN 6	T1.5/1.5	INIT OBS	PC
4 251228 5 251600	28.0N 142.6E 28.0N 142.0E	PCN 5 PCN 6	T1.5/2.5 /W1.0/24HRS	EXP LLCC	P(
6 2518 0 4 7 2518 0 5	27.8N 140.9E 27.0N 142.9E	PCN 6			P C
88 252159 89 252327	27.4N 140.7E 27.4N 140.6E	PCN 3 PCN 3 PCN 3 PCN 3		EXP LLCC Exp LLCC	PO
70 252327 71 260109	27.3N 140.5E 27.3N 140.4E	PCN 3 PCN 3	T1.5/1.5 /S0.0/24HRS		R(
70 252327 71 260100 72 260300 73 260508 74 260508 75 260943 76 261039 77 261200 78 261754	27.4N 139.8E 27.3N 139.4E	PCN 4 PCN 3 PCN 3	T0.0/1.0 /W2.5/24HRS	EXP LLCC INIT OBS	P(
260508 25 260943	27.1N 139.3E 27.6N 138.5E	PCN 4	T1.5/1.5	INIT OBS EXP LLCC	RF PC
25 260943 26 261039 27 261200	26.7N 138.4E 27.2N 137.9E	PCN 5 PCN 6		EXP LLCC	RI Po
28 261600 29 261754	26.9N 136.7E 27.0N 136.6E	PCN 6	T1.5/1.5 /S0.0/24HRS	PSBL SCNDRY LLCC 26.0N 133.6E ULAC 25.8N 134.6E	PO
30 261754 31 262100	26.1N 134.7E	PCN 6		ULAC 25.8N 134.6E	
78 261600 79 261754 80 261754 81 262100 82 262318 83 270048 83 270048 83 270048 83 270048	25.5N 133.5E	PCN 3	T3.0/3.0 /D1.5/25HRS T2.5/2.5 /D2.5/22HRS		PC RC PC
34 270048 35 270300	25.6N 133.1E	PCN 6	16.5/6.5 /DE.5/66HK5		P
36 270458 37 270600 38 270921	25.4N 132.8E	######################################		ULCO ETY	PC PC
270600 88 270921 89 270921 80 271017	24.8N 131.6E	PCN 3		ULCC FIX ULAC 24.6N 131.4E ULAC 24.6N 131.4E ULCC FIX EYE FIX	Pi Pi
271200 271329	24.6N 131.3E	PCN 6		ULCC FIX	P
3 271600 4 271743	24.4N 130.8E	DOM C	•	ULCC FIX	P.
5 271743 6 272100	24.7N 130.7E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5 /D1.0/25HRS		P
7 272256 8 272256	25.3N 129.0E 25.0N 129.0E	PCN 3	T3.0/3.0+/S0.0/23HRS		R
99 280000 82008S 00	BEFERRE ELEMENTE ELEMENTE ELEMENTE ELEMENTE ELEMENTE ELEMENTE ELEMENTE ELEMENTE ELEMENTE EL ELEMENTE EL ELEMENTE EL ELEMENTE EL	PUNH			Pi
81 280210 82 280300	24.9N 128.3E 24.7N 128.5E	PCN 3 PCN 3 PCN 6		INIT OBS EXP LLCC	RI
03 280600 04 280900	24.8N 127.4E 24.7N 127.2E	PCN 6	T3.0/3.0 /D0.5/29HRS	ULCC FIX EXP LLCC	P
95 281136 96 281136	24.6N 126.7E 25.4N 126.4E	PCN 6 PCN 3 PCN 6 PCN 6			R R
07 281200 08 281450	25.0N 126.7E 24.6N 126.6E			ULCC FIX ULCC FIX ULCC FIX ULCC FIX	P:
9 281600 0 281800	24.8N 126.3E 25.1N 126.2E	PCN 6 PCN 6 PCN 6	T3.5/3.5-/D1.0/23HRS	ULCC FIX ULCC FIX	P
1 282100 282140	25.4N 125.4E 24.9N 125.3E	PCN 6			P
290000	25.4N 125.0E 25.5N 124.9E	PCN 6	T4.0/4.0-/D1.0/24HRS	PSBL EYE FORMING	P R
6 290149	25.5N 124.7E 25.5N 124.7E 25.5N 124.7E 25.6N 124.3E 25.6N 124.3E 25.5N 124.0E	PCN 3 PCN 5 PCN 3	T3.5/3.5	INIT OBS	R
7 290300 8 290600	25.6N 124.2E	PCN 6 PCN 2 PCN 3	T4.5/4.5-/D1.5/24HRS	RAGGED EYE FIX	99
9 290618 0 290900 1 291020	25.5N 124.0E	PUN 4			R
1 291020 2 291114 3 201114	25.8N 123.9E 25.8N 123.5E 25.7N 123.8E 25.9N 123.8E 26.9N 123.8E	PCN 4 PCN 3 PCN 4		ULCC FIX	P R R
2 291114 3 291114 4 291200 5 291430	25.9N 123.8E	PCN 4 PCN 1		DECC FIA	P
6 291600	26.2N 123.3E 26.2N 123.1E	PCN 6	T4.0/4.0-/D0.5/24HRS	HICC FIX	RP
7 291800 8 292100 9 292118	26 6N 122 7F	PCN 6 PCN 6 PCN 6		ULCC FIX	P
11 202354	11000000000000000000000000000000000000	PCN 6 PCN 3 PCN 1	T4.0/4.0 T4.5/4.5 /D1.0/24HRS	INIT OBS EYE FIX EYE OPH WEST EYE FIX EYE OPH SW ULCC FIX	K K
300000 300300 300300	26.9N 122.5E	PCN 6	, IIO , DI IO/ETINO	ULCC FIX EYE FIX	R R P P
5 300607	27.6N 121.7E 27.4N 122.0F	PCN 2 PCN 6 PCN 1	T4.5/4.5 /S0.0/24HRS	EYE FIX	۲
6 300900 7 300959	27.5N 121.8E 27.4N 121.5F	PCN 6 PCN 4		นี้เว็อ ที่ใx	R P P
8 301052	27.9N 121.6E 28.1N 121.7E	PCN 6			P
0 301409 1 301600 2 301800	28.0N 121.4E 28.3N 121.0E	PCN 1 PCN 6		EYE FIX	P
3 301853	28.5N 121.1E 28.3N 121.0E	PCN 6 PCN 6		ULCC FIX	PRP
4 302100	28.4N 121.4E 28.8N 121.2E	PCN 6	T3.5/3.5	ULCC FIX INIT OBS	R
6 302339	29.4N 121.0E 29.4N 120.7E	PCN 4 PCN 3 PCN 6		ULCC FIX	R
8 310108 9 310109	29.5N 120.4E 29.3N 120.7E	9635653 PCXXXX PCXXXX PCXXXX		ULCC FIX	PR
	29.9N 120.5E 30.3N 120.7E	PCN 6		ULCC FIX	P
0 310300 1 310556 2 310556	30.3N 120.7E 30.3N 120.6E 30.3N 120.6E	5011 5			R P

155 31111 156 311121 157 31133 158 31138 159 31181 169 01021 162 01021 162 01021 165 01021 165 01021 167 01100 *168 01164 *169 01164 *170 01214 *171 01214 *172 02023 *175 02033 *175 02033 *176 02023 *177 02066 177 02096 180 0210	00 90 90 90 90 90 90 90 90 90 90 90 90 9	######################################	T3.0/3.0 T3.5/3.5 T3.0/3.0 T3.0/3.0		ULCC FIX ULCC FIX ULCC FIX INIT OBS ULCC FIX INIT OBS ULCC FIX INIT OBS ULCC FIX ULCC FIX INIT OBS INIT OBS INIT OBS PARTIALLY EXP LLCC EXP LLCC		######################################
			RAD	AR FIXES			
FIX TIME NO. (Z)	FIX POSITION RADAR	ACCRY	EYE EYE SHAPE DIAM	RADOB-CODE ASWAR TODEF	COMMENTS	RADAR Position	SITE UMO NO.
127 456500000000000000000000000000000000000	48L 40N 1227 0 98E LANND 1228 0 94E 1227 0 98E LANND 1228 0 98E LANND 1227	POOR GOOD GOOD POOR FAIR	25 25 25 50	55//3 52708 655//3 726111 555//3 772611 555//3 772611 555//3 772611 555//3 772611 555//3 72711 55//3 52711 55//3 52811 55//3 52811 55//3 52811 55//3 52811 55//3 52811 55//3 52811 55//3 52811 65//3 52811 66//3 5	YOZADAKE 280900Z YOZADAKE 281100Z	8E 8	777777 7333777 7477993233337777 7789932333337777 7789932333337777 77799323333377777 7779932333377777 7779932333377777 77799323777779 777993237777777777

GOOD 65//3 72705 6/// 52809 65//3 53011 6///3 72402 34933 50411 6/// 5/// 25//4 52711 MOV 3026 MOV 3515 FAIR 60 22923 53016 6/// 52909 53108 5318408 5323408 5523104 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 5523103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 55231103 5523103 552310 552310 552310 552310 552310 552310 552310 552310 FAIR 40 55//4 65//23 65//23 65//23 65//23 65//23 65//23 65//23

47931

FAIR POOR

SYNOPTIC FIXES

FIX	TIME	FIX	INTENSITY	NEAREST	COMMENTS
NO.	(Z)	POSITION	ESTIMATE	DATA (NM)	
107456787811	301800 302100 310000 310000 310500 311200 311200 311200 01000	28 6N 120 7E 29 7E 29 7E 29 7E 20 7E	050 040 040 030 030 030 030 030 030 030	055055005500 01100550005500 0010055000 001000	\$8653 58659 58646 58666 58653 58556 58549 58556 58549 58455 58457 58546 58549 58457 58546 585849 58457 58546 58585 58545 58457 58546 58585 58545 58457 58546 58585 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555 58555



Mo	UIND	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RECAST ERRORS DST UIN POSIT 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYCL AVERAGE SPEED OF TROPICAL CYCLONE		10. 118. 305. 58 6. 56. 156. 25 1. 7. 19.	5 KTS 72-HR 23. 59. 33. 25.

TYPHOON KIT FIX POSITIONS FOR CYCLONE NO. 8

FIX NO.	TIME	FIX Position	ACCRY	DVORAK CODE		
				DYONAK CODE	COMMENTS	SITE
1 2 3 4	310300 310600 310900 311200	EEBEBEBEBEBEBEBEBEBEBEBEBEBEBEBEBEBEBE	PCN 6 PCN 6 PCN 6	T1.0/1.0	INIT OBS	
5 6 7	311600 311700	20.8N 144.2E 21.2N 144.5E	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW PGTW
8	311800 312036	20.6N 144.5E 20.3N 143.5E	PCN 6 PCN 6 PCN 6		ULCC FIX	PGTW PGTW
10	312129 010048	21.0N 143.8E 21.7N 143.1E	PCN 6 PCN 5			PGTW PGTW
* 12 13	010300 010403	21.9N 142.9E	PCN 5 PCN 6 PCN 5 PCN 6	T1.5/1.5 /D0.5/24HRS T2.0/2.0	INIT OBS	PGTW PGTW
14	011008	22.2N 141.0E	PCN 6		1111 033	PGTW
15 16 17	011329	22.5N 141.3E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6			PGTW
18 19 20	011649	23.0N 139.3E	PCN 6	T1.5/1.5 /S0.0/24HRS		PGTW
20 21	3120490 91007491080 911007491080 9111276640 9111280 9111282 9111282 9111282 9111282 9111282 9111282 9111282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282 911282	22.7N 138.2E	PCN 6 PCN 6			PGTW PGTW
23	020028 020300	24.1N 137.7E 24.8N 137.4E	PCN 5 PCN 3 PCN 4	T1.5/1.5 /S0.0/24HRS		PĞTÜ PĞTW
21 22 24 25 26	0200303558 020053558 02105356 02216000 02216000 022120000 02222000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000 0230000	24.5N 137.1E 24.9N 136.2E	PCN 5	11.3/1,3 /30.0/EARS	EXP LLCC	PGTW PGTW
26 27	021308 021600	25.4N 135.8E 25.8N 135.8E	PON 6 PON 6 PON 6			PGTW PGTW
59 58	021820 022135	25.6N 135.3E 26.3N 135.3E	PCN 6	T2.0/2.0 /D0.5/24HRS		PGTW
31	030000	26.3N 134.7E 26.7N 134.6E	PCN 6			PGTW
27 289 200 301 303 303 4 *	030524	27.3N 134.2E	PCN 5	T2.0/2.0 /D0.5/24HRS		PGTW
36	030924 031015	27 9N 134 0E	PCN 6	T2.0/2.0		PĞTÜ PĞTÜ
97 * 38	031200	28.0N 134.0E 28.1N 134.0E	PCN 6	10.070.0	INIT OBS	RPMK RPMK
39 40	031430 031600	28.0N 133.2E 28.1N 134.0E	PCN 5 PCN 6	T2.0/2.0 /S0.0/24HRS		PGTW Rodn
41 42	031810 031810	28.0N 133.4E 27.9N 132.8E	00000000000000000000000000000000000000	= 10 . 00,0,0 d HING		PGTW PGTW
43 44	032114 032345	27.8N 133.4E 27.5N 133.3E	PCN 3 PCN 3	•		PGTW RPMK
						KELIK

48 49 50 51	040300 040513 040600	27.7N 133.1E 27.4N 132.9E 28.2N 133.0E 27.7N 132.5E 28.0N 132.9E 27.9N 132.8E 28.0N 132.9E	PCN 6 PCN 6 PCN 6 PCN 6	T2.0/2.0 T1.5/1.5 T2.5/2.5 /D0.5/24HRS	INIT OBS EXP LLCC INIT OBS ULCC FIX ULCC FIX ULCC FIX
5555555555	041044 041200 041600 041759 041759 042053	27.8N 132.6E 27.7N 133.0E 27.7N 133.0E 27.9N 132.7E 27.5N 132.7E 27.5N 132.1E 28.2N 131.3E	######################################	T2.0/2.0 /S0.0/24HRS	PARTIALLY EXP LLCC
60 61 62	042323 042323 050000	28.4N 132.1E 28.4N 132.0E 28.3N 131.9E	PCN 5 PCN 5 PCN 6	T3.5/3.5 /D2.0/22HRS	
63 64 65 67	050108 050108 050300 050502	28.4N 132.0E 28.1N 132.1E 28.4N 132.1E 28.3N 131.6E	PCN 5 PCN 5 PCN 6 PCN 5	T3.5/3.5 /D1.5/25HRS T3.5/3.5-/D1.0/24HRS	
67 68 69 70	050502 050600 050932 051021	28.4N 131.7E 28.5N 131.9E 28.4N 131.4E 28.6N 131.8E	PCN 3 PCN 6 PCN 6 PCN 4		ULCC FIX
71 72 73 74 75	051022 051200	28.6N 131.1E 28.6N 131.5E 28.7N 131.7E 29.4N 131.4E	PCN 6 PCN 6 PCN 5		ULCC FIX ULCC FIX ULCC FIX
74 75 76 77	051349 051600 051748 051749 052031	29.0N 131.6E 28.9N 131.9E	PCN 6 PCN 6 PCN 5	T2.5/2.5 /D0.5/24HRS	ULCC FIX EYE FIX ULCC FIX ULCC FIX
78 79	052100 052301	29.1N 132.0E 29.3N 132.1E 28.8N 132.0E	PCN 6 PCN 3 PCN 5	T3.5/3.5 /50.0/24HRS T3.5/3.5 /S0.0/24HRS	ULCC FIX
80 81 82 83	052301 060000 060048 060300	28.9N 132.0E 28.9N 132.2E 28.9N 132.2E 29.0N 132.3E	PCN 2 PCN 3 PCN 2	T4.0/4.0 /D0.5/21HRS T3.5/3.5	INIT OBS
84 85 86	060451 060600 060911	29.0N 132.2E 29.0N 132.6E 29.2N 132.4E 28.9N 132.8E	PCN 1 PCN 2 PCN 1		EYE OPN SW
87 88 89	061052 061200 061329 061329	28.9N 132.8E 29.0N 132.7E 29.1N 132.5E 29.2N 132.5E	PCN 1 PCN 1 PCN 1		EYE FIX SMM EYE FIX EYE DIA ЭNM EYE FIX EYE DIA ЭNM EYE FIX
90 91 92 93	061600 061737 061800	29.2N 132.5E 29.2N 132.5E 29.3N 132.5E	PCN 2 PCN 1 PCN 2	T4.0/4.0 /D1.5/24HRS	EYE FIX EYE FIX EYE FIX
94 95 96	062010 062100 062239	29.2N 132.2E	PCN 4 PCN 4 PCN 1	T4.5/4.5 /D1.0/23HRS	PÓOR ÉYE DEFINITION POOR EYE DEFINITION EYE FIX EYE FIX
97 98 99 100	070028 070300 070440 070600	29.3N 132.4E 29.5N 132.4E 29.7N 132.1E 29.7N 132.3E	PCH 1 PCH 2 PCH 1 PCH 2	T4.5/4.5 /D0.5/27HRS	EYE FIX 10NM EYE FIX EYE FIX
101 102 103	070900 070938 071031	29.9N 131.8E 30.0N 132.2E	PCN 2 PCN 1		EYE FIX
104 105 106	071200 071308 071726	30.1N 131.9E 30.0N 131.3E 30.1N 130.8E	PCN 2 PCN 1 PCN 2 PCN 5	T4.5/4.5 /D0.5/26HRS	EYE FIX EYE FIX EYE FIX ULCC FIX
107 108 109	071726 072100 072130	30.2N 131.1E 30.2N 130.6E 30.3N 130.9E 30.4N 130.1E	2 KOP E KOP E KOP	T4.0/4.0 T4.0/4.0 /W0.5/25HRS T4.0/4.0	INIT OBS
110 111 112 113	072359 072359 080000 080008	30.4N 130.1E 30.4N 130.4E 30.4N 130.0E 30.4N 130.0E 30.6N 129.9E	PCN 1 PCN 4 PCN 5	T4.0/4.0	INIT OBS RGD EYE FIX
114 115 116 117	080300 080430 080430	30.6N 129.9E 30.6N 129.3E 30.8N 129.6E	PCN 6 PCN 1 PCN 1 PCN 4	T4.5/4.5 /S0.0/25HRS	EYE FIX EYE FIX VIS EYE (POORLY DEFINED)
118 119 120	080600 080900 081010 081057	30.8N 129.6E 30.8N 129.6E 30.7N 129.6E 31.0N 129.1E 30.9N 129.1E 30.9N 128.9E 31.2N 128.7E	PCN 6 PCN 1 PCN 1		EYE FIX
121 122 123	081200 081430 081600		PCN 2 PCN 6	T4.5/4.5 /S0.0/23HRS	EYE FÎX EYE FÎX
124 125 126 127 128	081800 081858 082100 082109	31.2N 127.8E 31.4N 127.8E 31.4N 127.5E 31.9N 127.0E	PCN 6 PCN 6 PCN 3	T3.0/4.0 /W1.0/21HRS	PARTIALLY EXP LLCC
128 129 130 131	002100	31.8N 127.1E 32.2N 127.0E 32.3N 127.0E	6 000 6 000 6 000 7 000 7 000 8 000	T4.0/4.0-/S0.0/24HRS	RGD EYE FIX PARTIALLY EXP LLCC
133	090300	32.4N 127.8E	PCN 3	T4.0/4.0 /S0.0/25HRS	
134 135 136 137	090600 090601 090948 091200	32.5N 126.6E 32.5N 127.2E 32.5N 127.2E 32.5N 126.3E 33.0N 126.5E	PCN 4 PCN 2	T4.5/4.5-/S0.0/29HRS	EYE FIX
138 139 140	091409 091600 091800	33.5N 125.9E	FCH 6	T3.5/4.5 /W1.0/24HRS	EYEWALL OPN ESE
141 142 143	091847 092100 092314	33.1N 126.3E	PCN 5 PCN 6 PCN 3	T3.0/3.0-/W0.5/26HRS	ULCC FIX EYE FIX OPN SW
144 145 146 147	100108	33.9N 125.8E 34.3N 126.4E 34.3N 125.1E 35.1N 126.5E	PCN 3 PCN 4 PCN 3	T3.0/4.0 /W1.0/26HRS T3.5/4.5 /W1.0/18HRS	EXP LLCC
148	100550	35.5N 127.3E 35.9N 128.1E	@D@MUM4MD@@@D@ ZZZZZZZZZZZZZZZZZ PPPPPPPPPPPPPPP		ULCC FIX
150 151 152 153	101109	36.7N 128.8E 36.1N 129.5E 37.0N 128.4E	PCN 6 PCN 6 PCN 5		ULCC FIX
154 155 156	101349 101600	37.2N 129.9E 38.1N 129.5E	PCN 6	T2.5/3.0 /W1.0/24HRS	OLOU FIA
157 158 159 160	101836 102026	39.2N 130.5E 40.4N 131.1E	PCN 5 PCN 5		
161		41.0N 131.2E	PCN 5	400	

TYPHOON KIT FIX POSITIONS FOR CYCLONE NO. 8

AIRCR	SFT	FIXES	

FIX NO.	TIME	FIX POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG	MAX-FLT-LVL- DIR/VEL/BRG/	WND ACCRY RNG NAV/MET	EYE E SHAPE DI	EYE ORIEN- IAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN No.
10040000000000000000000000000000000000	20516 022204 030040 0300645 030944 032221 040027 040027 040027 042020 050020 050020 050020 050020 050020 070030 070030 070030 070030 070030 080025 080048 080025 080027 080027 080027 080027	24.1N 136.6E 25.8N 134.6E 25.9N 134.5E 26.3N 134.1E 27.4N 133.2E 27.7 SN 132.3E 27.7 SN 132.3E 27.7 SN 132.3E 27.7 SN 132.3E 27.7 SN 132.3E 27.7 SN 132.3E 28.8N 132.1E 28.8N 132.1E 28.8N 132.2E 28.8N 132.2E 29.3N 132.4E 29.3N 132.4E 29.3N 132.4E 29.3N 132.4E 29.3N 132.6E 29.3N 132.6E	1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT 15	2973 29945 29945 2878 2778 2778 2778 2778 2778 2778 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 288 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888 2888	10000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 11000000	86 30 0 1 20 0 1 50 0 1 1 4 6 6 0 0 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 0	030 78 140 250 74 090 230 70 130 130 76 230 130 76 230 130 76 230 130 76 230 130 76 230 150 86 090 270 55 140 150 75 060 330 74 230	8471667787747555000011055111115500001055	CIRCULAR SICIRCULAR CIRCULAR CIRCULAR CONCENTRIC CONCENTRIC CIRCULAR CONCENTRICAL CIRCULAR CORCULAR CORCULAR CIRCULAR CIRCULAR CORCULAR CO	23	+25 +26 +23 24 +26 +27 +28 28 +27 +26 +28 28 +27 +26 428 28 +27 +26 428 424 +28 +28 424 +24 +28 +28 +28 +27 +28 +28 +27 +28 +28 +27 +28 +27 +28 +27 +28 +27 +28 +27 +28 +27 +28 +27 +28 +27 +12 +14 +16 +12 +14 +16 +13 +14 +11 +15 +18 +13 +14 +15 +18 +11 +11 +17 +18 +18 +12 +14 +16 +11 +17 +18 +18 +12 +14 +16 +11 +17 +18 +18 +12 +18 +18 +12 +18 +18 +12 +18 +18 +11 +19 +18 +11 +10 +18 +12 +11 +19 +18 +11 +11 +19 +18 +11	3344556667788899991111211111111111111111111111111
FIX NO.	TIME	FIX POSITION	RADAR #	ACCRY	EYE SHAF	EYE	R FIXES RADOB-CODE ASWAR TODEF	,	COMMENTS		RADAR S POSITION UM	TE No.
12374567890123745678901237456789012374567890123745678901237456789012374567890123745678901237456789012374567890 1111111111111112222222222222222222222	0 40 40 40 40 40 40 40 40 40 40 40 40 40	288. 87 132.21122.2122.2222.2122.2222.2122.2222.2222.2222.2222.2222.2222.2222.2222		GOOD		15	1		SEBURI		### ##################################	999999999999999999999999999999999999999

90 91	961900 962000 962000	78.29 76.25 75.65	132.3E 132.4E	LAND LAND			1021	2 50000 2 50000				30.6N 28.4N 30.6N	31.0E	47869 47909
92 93	962198 962198	29.3N	132.4E	LAND			1021 5031	2 50000				30.6N 28.4N	31.0E	47869 47909
95 96 97 98	962299	29.2N NE. 95	132.3E	LAND LAND LAND			5031	2 50000				30.6N 28.4N 30.6N	31.0E	47869 47909
97 98	962300	79.2N 29.2N 78.0S	132 35	LAND LAND			5031	1 50000 3 50000 1 50000						47869 47909
100	070000 070000 070000 070000 070100	29 3N	138:4E	LANB	ecop	3	9 2251	5 50000				30.6N 1 31.3N 1 28.4N 1 33.4N 1	31.9E	47869 47743 47909
101	070000	78.9E 76.9S 76.9S	129.5E 132.3E	LAND LAND LAND	GOOD	5	1031	1 53405	MOV	2915	SEBURI	33.4N 1 30.6N 1	30.4E 31.0E	47869
104	010100	29.4N	132.3E	LAND	GOOD	3	а	3 20000 1 52705	MOV	3410		30.6N 1 28.4N 1 31.3N 1 30.6N 1	29.5E	47909 47743
106	979399 979399 979399 979499 979499 979599	29.5N 29.5N	138:4E	LAND LAND	GOOD	3	8	3 50000	MOV	0205		30.6N 1 31.3N 1 28.4N 1	31.0E	47869 47743
108	070400	29.5N	132.3E	LAND	0005	_	1051 2051	2 53508 4 50000				30.6N 1	31.0F	47909 47869 47909
111	970400 970500	29.5N 29.6N 29.7N	132.2E	LAND LAND LAND	GOOD	3		2 53405	M 011	2.00		28.4N 1 31.3N 1 30.6N 1 31.3N 1	31.9E 31.0E	47743 47869
113		20 CN	133 35	LAND	4000		2051	4 50000 2 53303	MUV	3405		31.3N 1 28.4N 1	31.9E 29.5E	47743 47909
115	970600 970600	29.6N 29.7N 29.7N	132.2E 132.3E	LAND	GOOD	2:	a 2061	4 53105	MOV	3505		58.48 1 30.68 1 28.48 1 21.38 1 30.38 1	31.0E 29.5E	47869 47909 47743
117 118 119	979699 979799 979799 979799	29.7N 29.8N 29.8N	132.3E	LAND	GOOD	1!	5	2 53605	MOV	3110		1 00.6N 1 1 00.0E	31.0E 31.9E	47869 47743
120	979799 979899	78, 25 78, 25 78, 25	132.1E	LAND LAND	GOOD	1	1041	4 53305 2 53005	MAU	2244		30.6N 1	31.0E	47909 47869
122	070800 070900 070900	29.9N	132.1E	LAND LAND	GOOD	19	1151	2 53508		3210 2905		31.3N 1 30.6N 1	31.9E	47743 47869 47743
124	070900 070900	40.05 40.05	132.1E	LAND			2041	3 50000 2 52705 3 53011				31.3N 1 28.4N 1 30.6N 1 28.4N 1 31.3N 1	29.5E 31.0E	47909 47869
126 127	070500 071000 071000 071000 071100	Ne.es 10.es 10.es	132.0E	LAND LAND LAND	GOOD	19	5	3 53011 2 53008	MOV	3010		28.4N 1 31.3N 1	29.5E 31.9E	47909 47743
128 129 130		NE. ES	131.8E	LAND	GOOD	31	3		MOV	2710		30.6N 1 31.3N 1 28.4N 1 30.6N 1 28.4N 1	31.0E 31.9E	47869 47743
131	071100 071200	29.9N 30.0N	131.9E	LAND LAND			2044	2 50000 2 52705 2 53105				30.6N 1	31.0E	47909 47869 47909
133 134 135	071200 071200 071300	29.9N 30.0N	131.7F	LAND	GOOD	20	1151	2 53008		2810		31.3N 1 30.6N 1	31.9E 31.0E	47743 47869
136	071300 071300	30.0N 30.0N	131.5E 131.6E 131.5E	LAND LAND LAND	GOOD	20	2041	2 52911 2 52711	MOV	2910		30.6N 1 31.3N 1 28.4N 1	31.9E 29.5E	47743 47909
137 138 139	071300 071300 071400 071400 071400	30.0N	131.4E 131.4E	LAND	GOOD	20	2041	2 42708	MOV	2905		30.6N 1 28.4N 1 31.3N 1	31.0E 29.5E	47869 47909 47743
140		30.0N 30.0N	131.3E	LAND LAND	GOOD	36	1151	2 53008		2910		30.6N 1	31.0E	47869 47743
142 143 144	071500 071500 071600	30.0N	131 EF	LAND			2031 5///	1 52705 / 52705 / 52803				31.3N 1 28.4N 1 30.6N 1 30.6N 1	29.5E 31.0E	47909 47869
145	071700	30.0N 30.1N	121 15	LAND LAND	GOOD	36	3		MOV	3010		31.3N 1	31.9E	47869 47743
146 147 148	071700 071700 071800	30.1N 30.1N 30.2N	131.0E	LAND LAND LAND	GOOD	30	5///	2 53105 / 53408	MOV	3010		28 4N 1 28 4N 1 29 1 3N 1 29 1 3N 1 20 1 4N 1 20 1 4N 1 20 1 4N 1 20 1 4N 1	29.5E 31.0E	47909 47869 47743
148 149 150 151	071800 071800 071800 071800 071900	30.2N 30.2N	131.1E	LAND			2051	2 53011 / 53011				28.4N 1 30.6N 1	29.5E 31.0E	47909
152	071900 071900 071900	78.0E 78.0E 78.0E	130.9E 130.9E 130.9E	LAND LAND LAND	GOOD	80	2041	2 52905	MOV	3010		31.3N 1 28.4N 1	31.9E 29.5E	47869 47743 47909
154 155	072000 072000	30.2N	130.BE	LAND	GOOD	26		2 52905 2 52708 2 53005	MOV	3010		30.6N 1 28.4N 1	31.0E 29.5E	47869 47909 47743
156 157	072000 072100 072100	96.3N NE.0E NE.0E	130.8E 130.8E 130.7E	LAND LAND			1941 2941	2 53005 2 53008 2 53308				30.6N 1 28.4N 1	31.0E 29.5E	47869 47909
158 159 160	072200	30.4N	130.7E 130.8E	LAND LAND LAND	COOR		2032	2 53308 2 53208				28.4N 1	29 SF	47869 47909
161	072200 072200 072200	30.4N	130 8E 130 6E 130 5E	LAND	GOOD	56	1031	2 53011		3010 3010		31.3N 1 30.6N 1 31.3N 1 28.4N 1	31.9E 31.0E	47743 47869
163 164 165	072300 072300 072300	30.5N	130.4E	LAND LAND		-	2031 1131	2 52908 2 52908 3 53108	1104	3010		31.3N 1 28.4N 1	31.9E 29.5E	47743 47909 47869
155	9 89999	30.5N 30.5N	130.4E 130.3E	LAND	GOOD	26			MOV	3010		30.6N 1 28.4N 1 31.3N 1	29.5E 31.9E	47909 47743
167 168 169	080000 080100 080100	30.5N 30.6N	130.3E 130.2E 130.2E	LAND LAND LAND	GOOD	26	3	2 53011	MOV	2715		30.5N I	31.9E	47869 47743
169 170 171	080100 080200	30.6N	130.1E	LAND			1131	2 53011 2 53011 2 52705				30.6N 1	31.0E	47909 47869
172	989299 989299 989299	30.6N 30.7N	130.1E 130.0E 129.9E	LAND	GOOD	26	,	3 53208 2 53011	MOV	3010		28.4N 1 31.3N 1 30.6N 1	91.9E 91.0E	47909 47743 47869
174 175 176	080300	30.7N	129.9E 139.9E	LAND LAND LAND			1021	3 53108				28.4N 1	29.5E	47909 / 47869 /
176 177 178	080300 080300 080400 080400	30.BN	129.7E	LAND			1021	1 //// 3 52911 2 53008				33.4N 1 30.6N 1	31.0E 30.3E 31.0E	47806 47869 47909
179 180	080500	30.8N	129.6E	LAND LAND	GOOD	15	1021	3 52708		3015		30 EN 1	29.5E 31.9E 31.0E	47743 47869
181 182 183	080500 080600 080600	30.7N 30.8N 30.8N	129.8E 129.5E 129.5E 129.5E	LAND	GOOD GOOD	36 15	i		MOV	3010 3015		31.3N 1	31.0E 30.8E 31.9E	47762 47743
184	ARAGAA	30.9N 30.8N	129.5E 129.5E	LAND LAND LAND	GOOD	19	1021	3 53008 3 53008	MAV	3015		28.4N 1 30.6N 1	29.5E 31.0E	47909 47869
185 186 187 188	0 80700 0 80700	18.0E	129.5E 129.5E	LAND LAND	GOOD	26	2041	2 50000		2915		34.2N 1 28.4N 1 31.3N 1	31.0E 30.8E 29.5E 31.9E	47869 47762 47909 47743
189	080600 080700 080700 080700 080700	30.98	129.4E	LAND	GOOD	29	1	3 52705	MOV	2915		30.6N 1 34.2N 1	31.0E 30.8E	47869 47762 47762
191 192 193 194	080800 080800	78.0E	11121211111111111111111111111111111111	LAND LAND LAND	GOOD	26		8 S27AE	MOV	2915 2906 2707		904 - 110 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 -	30.8E 31.9E	47762 47743 47869
193 194	080800 080900 080900	NG. 0E	129.3E 129.2E	LAND LAND	GOOD	26	,	8 52705 2 52905	MOV	2915		28.4N 1 34.2N 1	29.5E 30.8F	47909 47762
195 196 197 198	080900 080900	30.9H	129.1E	LAND LAND LAND	GOOD		2041 1031	2 53116 3 52908				28.4N 1 30.6N 1	29.5E	47909 47869 47743
198	081000 081000	31.0N	129.0E	LAND LAND	GOOD	26	2041	2 50000		3015 3015		31.3N 1 28.4N 1	31.9E 29.5E	47909
199 200 201	081000 081000	10.1E	129.0E 129.1E	LAND LAND	GOOD	26	1021	3 53011				30.6N 1	31.0E	47762 47869 47743
202 203 204 205	081000 081000 081100 081100	31.0N 30.9N	129.0E	LAND LAND	GOOD	19 20			MOV	2915 3010 2915		31.3N 1 34.2N 1	31.9E 30.8E	47743 47762
205	081100 081100	31.0N 31.0N	128.9E	LAND LAND LAND	GOOD	26	5561 1131	3 52705 2 52705	HOW	3015		30.6N 1 28.4N 1	31.0E 29.5E	47869 47909
206 207 208	081200 081200 081200	31.0N 31.0N	128.7E	LAND	GOOD	E4	5//6 5//6	2 53011 3 52808	NOV	3015		28.4N 1	31.9E	47743 47909
209 210	081200 081300	31.0N 31.0N	128.8E 128.5E	LAND LAND	GOOD	20	6///	2 52708	MOV	3015		34.2N 1 28.4N 1	30.8E	47869 47762 47909
211 212 213	081300 081300 081300	31.0N 31.0N	128.6E 128.7E 128.4F	LAND	GOOD	26	5//6	/ 53108	MOV	3015		30.6N 1 34.2N 1	31.0Ē 30.8E	47909 47869 47762 47869
213 214 215 216 217	081400 081400 081500 081500	31.1N 31.2N	128.5E 128.3E	LAND LAND LAND	GOOD	56		/ 53011 / 53005	MOV	3015		1 08.0E	30.8E	9//62
216 217	081500 081600	31.2N 31.3N	128.2E	LAND LAND	GOOD	26	65/4	/ 53111		3215		34.2N 1 30.6N 1 34.2N 1 30.6N 1	30.8E	47869 47762 47869
219	081600 081600 081700 081700	31.3N 31.3N	128.2E	LAND LAND	GOOD	20	6///	/ 52805		3210		34.2N 1 30.6N 1	30.8E	47762
223 223 223	081800	31.4N	128.0E	LAND	GOOD	20	6///	/ 53211		3220		34 . 28 . 1 36 . 28 . 1 36 . 28 . 1 36 . 28 . 1 37 . 28 . 1 37 . 28 . 1	30 . BE	47762 47869 47762 47762
667	081800 081800 081900 082000 082100	31.6N	127.6E	LAND LAND LAND	GOOD GOOD GOOD	20 15 15 15			MOV	3120 3120 3015 3115 3215		34.2N 1 34.2N 1	30.8E	47762 47762
225	082100 082200	31.8N 31.9N	127.4E 127.4E	LAND LAND	POOR POOR	15 20			MOV	3115 3215		34.2N 1	30.8E	47762 47762 47762 47762
227 228	082300 090000	MI.SE	127.4E 127.1E	LAND LAND	POOR POOR	36			MOV	3334		34.2N 1	30.BE	47762 47762 47762
229 230 231	090100 090200 090300	NS.SE	126 8E	LAND LAND	POOR POOR POOR	36			MOV	2915 2910 3315 2610		34.2N 1 34.2N 1 34.2N 1	30.8E 30.8E 30.8E	47762
231 232 233 234 235	090400 090400 090500	ME.SE	126.7E	LAND	GOOD GOOD	20 30 25 30 30 35 35			MOV	2610		34.2N 1	30.8E 28.8F	47762 47762 47844 47762
234 235	090500 090500	72.5N 72.50	126.7Ē 126.7Ē	LAND LAND	GOOD GOOD	35 35			MOV MOV	3010 3610 3610		34.2N 1 32.7N 1 34.2N 1 32.7N 1	30.8E	47762 47844

96789901237496789901237455 337344444444444555555 *********************	00000055550555555555555555555555555555	32.6N 126.6E 32.8N 126.5E 32.8N 126.4E 32.9N 126.3E 33.2N 126.6E 33.2N 126.6E 34.1N 126.6E 34.1N 126.6E 34.1N 126.6E 34.1N 127.0E 34.5N 127.0E 34.5N 127.0E 34.5N 127.0E 34.5N 127.0E 34.5N 126.0E 34.5N 126.0E 33.5N 126.0E 33.5N 126.0E 33.5N 126.0E 33.5N 126.0E 33.5N 126.0E	AND GGGPPHANDD PHANDD P	OOD OOD OOD OOR OOR OOR OOR OOR OOR OOR	355000 37772 2		MOV 3018 MOV 3418 MOV 3418 MOV 3418 MOV 3418 SPRL BAND A SPRL BAND A	ANA REA REA FUSE REA REA REA	34. 2X 130 8E 32. 7N 128. 6E 6E 6E 32. 7N 128. 6E	47762 47844 47844 47844 47844 47141 47158 47148 47148 47148 47141 47158 47141 47158 47141 47158 47158 47158 47158 47158 47158
					RAD	AR FIXES				
FIX NO.	TIME (2)	FIX POSITION	RADAR ACC	RY SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	c	OMMENTS	RADAR POSITION	SITE UMO NO
	080400 080500 080500 080780 080780 0808080 081200 081200 081500 081500 081500 081500 081500 081500 081600 082200 082200 082200 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 082300 08200 08200 08200 08200 08200 08200	90. 8N 129. 8E 30. 8N 129. 5E 30. 8N 129. 5E 30. 8N 129. 5E 30. 8N 129. 5E 30. 8N 129. 4E 30. 9N 129. 4E 30. 9N 129. 4E 30. 9N 129. 4E 30. 9N 129. 4E 31. 10 128. 7E 31. 11 128. 4E 31. 11 128. 4E 31. 128. 128. 2E 31. 128. 128. 2E 32. 148. 126. 6E 32. 148. 126. 6E 33. 148. 126. 5E	LARTON DE LA CARTON DEL CARTON DE LA CARTON DEL CARTON DE LA CARTON DEL CARTON DE LA CARTON DE L			10411 53113 1041/ 52711 1041/ 52711 1041/ 52705 1041/ 52805 1041/ 52805 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1041/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/ 52806 1051/			33.4N 130.3E 33.4N 130.3E	47896 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966 478966
FIX	TIME (Z)	FIX POSITION			SYNOP	TIC FIXES				
NÖ.						COMMENTS				
1 2 3 4	092100 100000 100600 100900	34.2N 126.2E 34.5N 126.6E 35.4N 126.8E 36.4N 128.0E	065 065 060 045	036 015 015 015	47165 47165 47158 47133	47158 47182 47 47156 47182 47 47165 47133 47 47135 47143	189 189 129			

TROPICAL STORM LEE BEST TRACK DATA

MO/DA/HR POSIT WIND POSIT 081006Z 22.7 131.3 25 0.0 0.0	WIND DẬT WIND POSIT WIND DS' 9 -0. 0. 0.0 0.0 00.	RORS ERRORS WIND POSIT WIND DST WIND 0.000000.0.	0.0 0.0 00. 0.
0810122 22.8 131.1 25 0.0 0.6 0810182 23.3 130.8 25 0.0 0.6 0811002 23.1 130.5 30 0.0 0.6 0811002 23.4 130.5 35 23.5 130.5 0811102 23.9 129.7 40 23.8 129.8 0811182 24.7 129.1 45 24.8 129.1 0812002 25.5 128.7 50 25.6 128.6		0. 0. 0. 0. 0. 00. 0. 0. 0. 0. 0. 00. 0. 0. 0. 0. 0. 00. 0. 0. 26 4 126.6 65. 275. 5. 15. 27. 2 126.2 35. 308. 25. 15. 30. 7 126.2 30. 231. 30. 5. 32. 2 124.9 30. 253. 25.	0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 29.1 126.3 75. 620. 30. 30.5 126.0 95. 694. 70. 0.0 0.0 00. 0.
081206Z 26.4 128.6 50 26.8 127.8 081212Z 27.6 128.0 50 27.8 127.8 081218Z 28.8 127.1 55 28.8 127.8 081300Z 29.7 126.3 60 30.0 126.1 081306Z 30.9 125.6 60 31.4 125.3 081312Z 32.2 124.9 60 32.1 125.3	0 50. 45. 0 30.6 126.3 65. 40. 5 50. 16. 0 32.0 126.7 65. 92. 5 55. 21. 0 33.0 126.9 65. 149. 60 21. 0 34.4 125.0 65. 122. 60 34. 0 36.5 124.9 60. 176. 60 21. 0 37.5 125.8 55. 282.	5. 33 8 126 3 65 339 20. 5. 36 1 127 5 55 354 30. 5. 0.0 0.0 00. 0. 10. 0.0 0.0 00. 0. 15. 0.0 0.0 00. 0. 30. 0.0 0.0 00. 0.	0.0 0.0 00. 0. 0.0 0.0 00. 0.
0813182 34.2 124.3 60 34.0 124.4 6814002 36.4 124.5 55 36.3 124.2 0814062 39.4 125.4 45 39.5 125.1 0814122 42.0 127.6 25 41.8 127 1		8: 8: 8: 8: 8: 8: 8: 8: 8: 8: 8: 8: 8: 8	6.0 6.0 66. 6. 6.0 6.0 66. 6. 6.0 6.0 66. 6.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	ALL FORECASTS (NG 24+HR 48-HR 72-HR 18. 129. 293. 657. 12. 51. 77. 17. 1. 11. 23. 50. -1. 11. 23. 50. -1. 11. 23. 50. -1. 10. 6. 2	TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 43-HR 72-HR 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9.	
DISTANCE TRAVELED BY TROPICAL CYCL	ONE IS 1307. NM		
AVERAGE SPEED OF TROPICAL CYCLONE	IS 13. K'SUT\$		

TROPICAL STORM LEE FIX POSITIONS FOR CYCLONE NO. 9

FIX NO.	TIME (Z)	FIX POSITION			COMMENTS	SITE
NO.		TERREBURE TERR		T1.0/1.0 T1.0/1.0 T1.5/1.5 T1.5/1.5 T1.5/1.5 /D0.5/27HRS T2.5/2.5 /D1.0/24HRS T2.5/2.5 /D1.0/26HRS T2.5/2.5 T3.5/3.5 /D1.0/24HRS T3.5/3.5 /D1.0/24HRS T3.5/3.5 /D1.0/24HRS	INIT OBS INIT OBS INIT OBS INIT OBS ULAC 21.0N 129.1E ULAC 21.0N 130.1E INIT OBS ULAC 21.0N 130.1E INIT OBS ULCC FIX INTI OBS PART EXP LLCC ULAC 32.3N 127.0E PART EXP LLCC	
4499123456789991 **	131804 131800 131800 14001 14001 14001 14000 14000 14000 14000 1400 1411 1411 1411 1411	34.2N 123.2E 35.7N 124.3E 36.3N 123.6E 36.6N 125.0E 37.2N 125.0E 40.1N 125.4E 40.1N 126.3E 40.1N 126.4E 40.1N 126.4E 41.4N 126.4E 42.7N 127.6E 43.1N 128.1E 41.8N 127.7E 43.6N 128.6E	# # # # # # # # # # # # # # # # # # #		ULCC FIX EXP LLCC	######################################

AIRCRAFT FIXES

FIX NO.	TIME (2)	FIX POSITION	FLT LYL	700MB HGT	OBS MELP	NAX-SEC VEL/BR	MAX- DIR/	FLT- VEL/	LVL~ BRG/	UND RNG	ACC NAV/	RY MET	EYE SHAFE	EYE ORIEN- DIAM/TATION	0UT/	E TEN	1P (0 DP/9	ST	MSN NO.	
* * * * * *	10F650 110019 110653 110233 120642 120642 120642 1220946 1220	22.8N 131 3E 22.1N 139 6E 23.6N 139 2E 23.6N 128.8E 23.5N 128.8E 25.3N 128.6E 25.3N 128.6E 27.1N 128.6E 27.1N 128.0E 27.2N 128.0E	1500FT 700MB 1500FT 1500FT 1500FT 700MB 1500FT 700MB 1500FT	3015 2984	7701100 999999 9099999 9	10 0435 60 335 40 5 3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	90 90 48 90 72	300 310 140 180	27 39	270 960 120 940 190 980	10000000000000000000000000000000000000	18888884555	30 30 12 12 13 10 10 10 10 10 10 10 10 10 10 10 10 10			+12877 +2277 +2277 +2277 +2274 +244 +244	+12 + +27 + +26 + +26 +	98998	288888	-2009445566
							RADA	R FIXE	S											
FIX NO.	TIME (2)	F1X POSITION		ACCRY	EYE SHAPE	E D1	MA	RADOB ASUAR	-COD	FF				COMMENTS		RAD POSIT	ION	W	SITE	io .
12345678	120300 120500 120500 120500 120600 120600 120607	9998 9988 128888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 1288888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 128888 12888 128888 128888 128888 128888 128888 128888 128888 12888 12888 128888 128888	LAND LAND LAND LAND LAND LAND LAND	POOR			35	5///3 5///3 55//3 6///1 55//2	536 500 736	00 11 00 04 05	MOV	021	5		2020000	22777777777777777777777777777777777777	127.8 127.8 126.8 127.8 129.8 129.8	E	4793 4793 4792 4793 4796 4793 4790	7 9 7 9 7
9 10 11 11 11 11 11 11 11 11 11 11 11 11	120700 120700 120800 120800 120900 1211000 1211000 1221000 13211000	28.4 1 128.9E 44 1 128.9E 27.4 1 128.9E 27.6 1 128.4E 27.6 1 128.7 28.1 1 128.7 28.1 1 128.7 28.5 28.6 28.6 28.6 28.6 28.6 28.6 28.6 28.6		POOR POOR				56,73030300000000000000000000000000000000	536 7336 5335 5331 5331 535	01160 01160 0270 0287					ขอขอขอขอขอของอาก	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	127.8 127.8 127.8 1127.8 1129.8 1129.8 1129.8 1129.8 1129.8 1129.8		4793 4793 4793 4793 4799 4799 4799 4793 5836	79797999977
212345678 22222222	132205 1322305 1322305 132335 132335 140005 140035 140105	22.5N 125.1E 35.0N 124.9E 36.0N 124.9E 36.2N 125.0E 36.3N 125.0E 36.5N 125.0E 36.5N 125.0E 36.5N 125.0E 36.5N 125.2E 37.0N 125.2E	LAND	POOR POOR POOR POOR POOR POOR POOR											**************************************	22222222222222222222222222222222222222	126 . 6 126 . 6 126 . 6 126 . 6 126 . 6 126 . 6		4714 4714 4714 4714 4714 4714 4714 4714	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1



MO DA / HR 081506Z 25.2 124.4 25 0.0 0.0 081516Z 25.7 125.6 25 0.0 0.0 081516Z 25.7 125.5 0.25 0.0 0.0 081516Z 25.7 125.5 0.25 0.0 0.0 0.0 081516Z 25.7 125.5 0.25 0.0 0.0 0.0 081516Z 25.7 125.5 0.25 0.0 0.0 0.0 081516Z 25.7 125.5 9.5 0.25 0.5 126.6 126.7 125.7 50.0 25.0 126.6 126.6 127.0 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5 127.5	SER SER	0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERRORS DST JIND -0. 0. 0. 0 0. 0 0. 0 00. 00. 0. 0. 0 0. 0
082000Z 43.9 125.5 25 43.3 125.2 AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS	ALL FORECASTS NG 24-HR 48-HR 72-HR 26. 120. 229. 266. 14. 70. 147. 22. 14. 9. 18. 29. 0. 9. 18. 29. 17. 13. 9.	TYPHOONS WHILE OVER 35 WRNG +4-HR 48-HR 25. 115. 203. 24 13. 73. 139. 1 10. 14.	5 KTS 72-HR 93: 23: 23:

AVERAGE SPEED OF TROPICAL CYCLONE IS 12. KNOTS

TYPHOON MAMIE FIX POSITIONS FOR CYCLONE NO. 10

FIX NO.	TIME (Z)	POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
123456	000 6900 15123049 15123049 15123240 15122400 1522240 1600040 1600030 1600030 160003	######################################	22222222222222222222222222222222222222	T1.5/1.5 T1.0/1.0	INIT OBS	נבסנסנבונות מאות מתחת מתחת מתחת מתחת מתחת מתחת מתחת מת
56789	152100 152245 160000	26.0N 126.0E 26.4N 126.3E 26.5N 126.3E	6663655566		PARTIALLY EXP LLCC	PGTU PGTU PGTU
10	160026 160026	26.3N 126.7E 26.3N 126.6E	PCN 5 PCN 5	T2.5/2.5	INIT OBS	RODN RPMK
11 12 13 14 15	160300	26.9N 126.0E	PCN 6 PCN 6	T2.5/2.5	INIT OBS	PGTW
15 16	160627 160900	27.0N 126.2E 27.3N 126.2E	PCN 5 PCN 6	T2.5/2.5 /D1.0/24HRS		RODN PGTW
17 * 18	16601011000000000000000000000000000000	27.3N 126.0E	0563556 PPCZZZZZZZ PPCCZZZZZZZZZZZZZZZZZZZZZZZ		ULCC FIX	RODN
19 20	161200	27.4N 126.1E	PCN 6	T2.5/2.5 /D1.5/27HRS		PGTW
12345678901234567890 22222223333333333	161600 161800	27.5N 125.8E 27.7N 125.7E	######################################			PĞTÜ PĞT ü
24 25	161913	27.7N 126.1E 28.6N 125.8E	PCN 5 PCN 6	•	HELL DESTAISE OF MEET	RKSO PGTW
27 28	170000	28.4N 125.8E	PCN 6		WELL DEFINED CENTER	PGTU
29 30	170004	28.3N 125.9E 28.2N 125.5E	PCN 3 PCN 5	T3.5/3.5-/D1.0/24HRS		RPMK PGTW
31 32	170300 170600	29.1N 125.0E 29.0N 124.6E	PCN 6	T3.0/3.0 /D0.5/24HRS	PARTIALLY EXP LLCC	PĞTÜ
33 34	170617 170900	29.0N 124.6E 29.3N 124.3E	PCN 3	T3.0/3.0	INIT OBS PARTIALLY EXP LLCC	RKSO PGTW
35 36	171021	29.3N 124.1E 29.2N 124.5E	PCN 4 PCN 3 PCN 6			PGTW RKS0
38	171450	29.7N 123.7E	PCN 4	T3.0/3.0-/D0.5/28HRS		RKSO
40 41	171800 171902	29.5N 123.1E 30.2N 123.0E	PCN 6 PCN 6 PCN 3	13.0.3.0 / 20.3/ Boliko		PGTW
42 43	172100 172342	29.9N 123.1E 31.2N 122.3E	036363634 PCCXXX PCCXXX PCCXX	T4.0/4.0	INIT OBS	PGTW RODN
43 44 45	180000 180149	30.6N 122.6E 31.4N 122.3E	PCN 6 PCN 3	T4.5/4.5-/D1.0/25HRS T4.0/4.0-/D1.0/24HRS		PGTW RPMK
46 47	180500	31.4N 122.0E	PUNE	14.0/4.0-/D1.0/24HRS		PGTU
49 50	180900	32.3N 121.2E	PCN 3 PCN 6 PCN 3			PGTW
51 52	181040	32.5N 120.9E	PCN 4 PCN 6			RODN
53 54	181429	33.5N 120.8E 33.7N 120.9E	PCN 4 PCN 6			RODN
7890123456789 44456555555555	181600 181800 181851 182100 182320 190000	34.2N 120.5E 33.9N 120.8E	PCN 6	T2.0/3.0 /W1.0/26HRS		PGTW
57 58	182100 182320	34.4N 119.7E 35.5N 120.6E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5	INIT OBS	PGTU RKSO
60	190000	35.4N 120.1E	PCN 6	T2.0/2.5 /W2.0/24HRS	PARTIALLY EXP LLCC ULCC FIX	PGTW
61 62	190555 190600	37.5N 121.0E 37.5N 120.7E	PCN 5		ULUC FIX	RPMK PGTW

63 64 65 66 67 68 69 70	190906 191206 191409 191606 191841 200006 20003 200108	9 40.2N 128 9 39.9N 121 9 41.6N 123 42.4N 123 1 43.3N 128	2.0E 1.6E 2.2E 3.6E	66566655 7777777 70000000000000000000000									U	KP LLCC LCC FIX LCC FIX				P. P. P. P. R.	GTW GTW KSO GTW KSO KSO KSO
							AIRC	RAFT I	FIXE	s									
FIX NO.	TIME (Z)	FIX POSITION	FLT	700MB HGT	OBS MSLP	MAX~SF VEL/BR	C-WND G/RNG	MAX DIR	-FLT VEL	-LVL ∠BRG	-UND /RNG	AC:	CRY /MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	OUT/	E TEMP IN/ DP	(C) /SST	MSN NO.
1 2	152340 162049	26.4N 126.1E 28.6N 125.6E	1500FT 700MB	.2986	9 9 6	55 10 65 09	0 10 0 70	160 170	52 69	050 090	60 60	15 15	5 4			+26	+27 +25 +19 + 9		į
							RADA	R FIXE	3										
FIX NO.	TIME (Z)	FIX POSITION	RADAR #	ACCRY	EYE SHAPE	E D	YE IAM	RADO	e TD	DE DFF				COMMENTS		RADI POSIT	AR I ON	SIT	E No.
123456789	160200 160300 160400 160500 171500 171500 172100 172100	26.7N 125.5E 26.9N 125.5E 27.0N 125.5E 27.1N 125.5E 27.1N 125.5E 26.9N 125.9E 29.5N 123.7E 29.5N 123.7E 30.3N 123.7E 30.5N 123.0E	LAND LAND LAND LAND LAND LAND LAND LAND					6///3 6///3 6///3 6///3 12323 34764 34894	73. 73. 73. 73. 73.	405 409 605 /// 208	STA 150 STA	1 LA1	T/LOI IX T: T/LOI	NG UNK IME STA LA NG UNK	T∕LONG UNK	26.20 26.20 26.20 26.20 26.20 28.20 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22 28.22	127.8E 127.8E 127.8E 127.3E ***** *****	479 479 479 479 587 587 587	37 60 60 60
						S	NOPT	IC FIX	ES										
FIX NO.	TIME (2)	FIX POSITION	INTENSI ESTIMAT	TY NEA	REST A (NM)			c	OMME	ENTS									
1234567	181200 181500 181800 182100 190900 191200 192100	33.1N 121.1E 33.4N 120.3E 34.1N 120.0E 34.8N 119.8E 38.9N 120.9E 39.0N 121.3E 43.0N 125.3E	965 965 959 9335 925	-	055 015 030 030 030 040 040	58 58 58 58 58	150 5 150 5 150 5 150 5 1656 5 1662 5	58251 58251 58040 58150 58662 58656 54259	5845 5427	54 58 73 54	3539 1172								

TYPHOON NELSON BEST TRACK DATA

		BEST TRACE	к	WARNING		24	HOUR F	ORECES"	Ť	48	HOUR F	ORECAS	T	7	2 HOUR	FORECE	ST
	R 16610000000000000000000000000000000000	. –	WIND POSIT 20 0.0 0 20 0.0 0 20 0.0 0	UIND 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0050550000 1008	1 T 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	D	ERT 1	00000000000000000000000000000000000000	T 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	NI 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ESESESESESESESES	00000000000000000000000000000000000000	T 00001488665571940877.0000000000000000000000000000000000	U 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EST	RORS
A A A	VG RÌGH VG INTE VG INTE UMBER O	CAST POSIT E T ANGLE ERRO NSITY MAGNIT NSITY BIAS F FORECASTS TRAVELED BY)R	WRNG 10. 9. 2. -1. 26	64. 13 47. 8 11. 1 6. 1 22 1	8. 148. 8. 8. 3. 6.			TYPHOO JRNG 10. 9. 2. -1. 25	DNS WHIL 24-HR 64: 47: 11: 22	E OVER 48-HR 132. 88. 13. 17	35 KT: 72-HI 182: 148: 6: 14					
			OPICAL CYCLO		9.	KNOTS											

TYPHOON NELSON FIX POSITIONS FOR CYCLONE NO. 11

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
* 1 2 3 4 5	152245 160300 160901 160943	13.2N 142.1E 15.8N 142.2E 17.1N 143.6E 17.2N 143.7E	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	T1.0/1.0 T1.0/1.0	INIT OBS INIT OBS	PGTW PGTW PGTW PGTW PGTW
67	161328 161731	17.3N 143.4E 17.4N 143.5E	PCN 5 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW
* 8 * 9	162100 162223	16.7N 142.7E 17.4N 143.3E	PCN 6 PCN 5	T1.0/1.0	INIT OBS	RPMK PGTW
10 11 12 13 14	170028 170435 170600	18.6N 142.4E 19.4N 142.5E 19.6N 141.8E 19.9N 141.5E	PCN 6 PCN 5 PCN 6 PCN 6	T1.5/1.5 /D0.5/24HRS	SCHOOL SECOND TO THE SECOND TO	PGTW PGTW PGTW
14 15 16	171200 171600 171720	20.1N 141.3E 20.0N 141.5E 20.2N 141.1E	######################################	T2.5/2.5+/D1.0/22HRS		PGTW PGTW PGTW
17 18 19 20 21 22	\$0013085000000173000000099800005568880900017800000000400055500000000568880900017800000040005500000000000000000000000000	######################################	00000000000000000000000000000000000000	T2.5/2.5+/D1.0/24HRS	ULAC 20.8N 140.2E	PGTW PGTW PGTW PGTW PGTW PGTW
01123456789012334567890 020222222333333333333333	181000 181200 181248 181600 181709 181709	22.4N 138.7E 22.5N 138.5E 22.5N 138.7E 22.7N 137.7E 22.6N 137.6E 22.6N 137.6E	22 22 22 22 22 22 22 22 22 22 22 22 22	T4.0/4.0 /D1.5/24HRS		PGTW PGTW PGTW PGTW RODN PGTW
29 30 31	182058 182100 182320	22.4N 136.9E 22.3N 136.4E 22.3N 136.8E 22.5N 136.5E	PON 6 PON 5 PON 5	T3.0/3.0	INIT OBS	PGTW RPMK PGTW PCTU
33 34 35	190128 190300 190555	22.3N 136.2E 22.8N 136.1E 22.6N 136.1E	PCN 5 PCN 6 PCN 5	T4.5/4.5 /D2.0/24HRS T4.0/4.0	PSBL EYE FORMING INIT OBS	PGTW RPMK PGTW
36 37	190555 190555	23.0N 135.9E 23.0N 135.7E	PCN 3 PCN 6	T4.5/4.5	INIT OBS	RODN PGTW
38 39 40	191018	23.2N 134.9E 22.9N 135.2E	PCN 6 PCN 5	T4.0/4.0	INIT OBS	RPMK PCTU
41 42 43 44 45	191200 191409 191600 191800 191841	23.1N 134.0E 22.8N 134.3E 23.0N 133.8E 22.9N 133.7E 22.8N 133.3E	PCX X PCX PCX PCX PCX PCX PCX PCX PCX PC	T4.0/4.0+/S0.0/24HRS	ULCC FIX ULCC FIX ULCC FIX	PĞTÜ PGTW PGTW RPMK PGTW
46 47 48 49 50 51	192037 192258 200000 200544 200544 200917	23.0N 133.5E 23.0N 133.2E 23.1N 132.4E 23.2N 132.2E 23.0N 131.9E	PCN 5 PCN 6 PCN 4 PCN 3 PCN 4	T4.5/4.5+/S0.0/26HRS T4.5/4.5	COMMENTS INIT OBS INIT OBS INIT OBS INIT OBS SCNDRY LLCC 16.0N 140.1E ULAC 20.8N 140.2E INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS ULCC FIX ULCC FIX INIT OBS	PGTW PGTW PGTW RKSO PGTW

52	PCN 2 PCN 4 PCN 1 PCN 4 PCN 1 PCN 3 PCN 1 PCN 1 PCN 1 PCN 1 PCN 1 PCN 2 PCN 1 PCN 2 PCN 1 PCN 2 PCN 1 PCN 2 PCN 2 PCN 2 PCN 2 PCN 4 PCN 2 PCN 6	I DEVELOPING EYE WALL I I I I I I I I I I I I I I I I I I	TANANAUNGANAUNGANAUNNAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANAUNGANGANGANGANGANGANGANGANGANGANGANGANGAN
FIX TIME FIX FLT NO. (2) POSITION LVL	AIRCRAFT FIXES 700MB OBS MAX-SFC-WND MAX-FLT-LVL- HGT MSLP VEL/BRG/RNG DIR/VEL/BRG) MSN ST NO.
* 1 162357 16.7N 139.8E 1500FT 2 172337 20.6N 140 7E 700HE 2 172337 20.6N 140 7E 1500FT 2 172337 20.6N 140 7E 1500FT 2 172337 20.6N 139.7E 1500FT 2 182346 22.2N 139.4E 1500FT 2 182346 22.2N 139.6E 700HE 2 190855 23.1N 135.7E 700HE 2 190855 23.1N 135.7E 700HE 10 192159 27.1N 133.1E 700HE 11 192159 27.1N 133.1E 700HE 12 200835 23.1N 135.2E 700HE 12 200835 23.1N 132.2E 700HE 12 201140 27.6N 131.7E 700HE 14 210582 37.9N 131.7E 700HE 15 210856 24.1N 128.5E 700HE 15 210856 24.1N 128.5E 700HE 16 211140 24.2N 128.5E 700HE 17 212338 24.3N 126.4E 700HE 18 212344 24.5N 125.8E 700HE 19 220833 24.5N 124.4E 700HE 20 221105 24.6N 123.8E 700HE	990 65 050 90 140 55 050 090 90 90 90 90 90 90 90 90 90 90 90 9	72 10 7 + 425 +25	12277556677889001122 1111111
FIX TIME FIX	RADAR FIXES EYE EYE RADOB-CODE_	RADAR	SITE
NO. (2) POSITION RADAR (1) 1 210300 24.1N 129.5E LAND 2 210400 24.1N 129.2E LAND 3 210500 24.1N 129.0E LAND 4 210600 24.1N 128.9E LAND 4 210600 24.1N 128.9E LAND	SCORY SHAPE DIAM ASWAR TODEF 5///2 52516 5///2 52611 5///2 72709	26.2N 127.8E 26.2N 127.8E 26.2N 127.8E 26.2N 127.8E	MO NO. 47937 47937 47937 47937
5 210700 24 1N 128 3E LAND 6 210800 24 1N 128 5E LAND 7 210800 24 1N 128 5E LAND 8 210900 24 1N 128 5E LAND 9 2110900 24 1N 128 3E LAND 10 2110900 24 1N 128 3E LAND 11 211100 24 1N 128 3E LAND 11 3 211100 24 1N 128 3E LAND 11 3 211100 24 1N 128 3E LAND 11 4 211100 24 1N 127 3E LAND 11 5 211100 24 1N 127 3E LAND 12 211100 24 1N 127 3E LAND 13 211100 24 1N 127 3E LAND 14 211100 24 1N 127 5E LAND 21 211400 24 1N 127 5E LAND 22 211400 24 1N 127 5E LAND 23 211500 24 1N 127 5E LAND 24 211500 24 1N 127 5E LAND 25 211500 24 1N 127 5E LAND 26 211600 24 2N 127 5E LAND 27 211600 24 2N 127 5E LAND	POOR 40	MOV 2726 MOV 2936 MOV 2726 MOV 27	47937 47937 47939 47939 47937 47937 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939 47939

27 28	211600 211700 211700	24.2N 24.2N	127.2E 127.0E 127.1E	LAND	POOR	40	5///2 72812	MOV	2720	26.2N 76.3S	127.8EE124.2EE124.8EE1224.8EE1224.8EE1225.8EE1225.8EE1224.8EE1225.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1224.8EE1
30	211800	24.3N 24.2N	126.9E	LAND	POOR	40	65//3 /////	MOV	2720	24.3N 26.3N	124.2E
31 32	211800	24.2N 24.2N 24.2N	126.9E 126.8E 126.7E	LAND	POOR	50	31913 52511		2720	NE. 45	124.2E
33 34	211900 212000 212000	24 . CN	126.3E	LAND	POOR	40	21883 50000		2720	24.3N	124 ZE
35 36	212000 212000	24.4N 24.3N	126.6E	LAND			21813 53012 5///2 72807	,,,,,	2.20	24.8N	125.35
36 37 38	212100	24.5N	126.5E	LAND	POOR	40	55/63 52916	MOV	3056	26.38	126.8E
39 40	212200 212200 212300 212300	24 . 35 . 35 . 35 . 35 . 35 . 35 . 35 . 3	126 SE	LAND	POOR	40	55/13 52919	MOV	9806	26 3N	126 RF
41 42	212300	24.5N 24.4N	126 2F	LAND		40		YOM	3026	24.3N 26.3N	124.2E 126.8E
43	220000	24.5N	126.0E 125.9E 127.0E	LAND			21883 72815 2//13 5 27 0 5			24.3N 24.8N	124.2E
45	909955	24.3N	125.8E	LAND	1	35	50933 72715	MOV	5836	24.8N	125.3E
46 47	220000 220000 220100	24.5N 24.5N	125 .8EE 125 .8EE 125 .8EE 125 .7EE 1225 .7EE 1225 .5EE 1225 .5EE 1225 .6EE	LAND)	40	5///2 72809 50723 72707	MOV	2926	NE. 38	126 . BE
48 49	220100	24.5N 24.5N 24.5N	125.8E	LAND	POOR	30	50723 72707	MOV	2810	24.3N	124.2E
50 51	220100	24.5N 24.5N	125.7E	LAND	GOOD	20	12722 52711	YOM	2810 2810	26.3N	126.85
52 53	220100 220200	24.5N 24.5N	125.7E	LAND)		12722 52711 5///2 72810 12712 52714 50814 73009			26 SN	127.8E
54 55	220200	24.5N 24.6N	125.6E	LAND)	95	50814 73009	. MAV	2810	24.3N	124.SE
56 57 58	220200	24 CN	125.5E 125.5E 125.2E	LAND		20	5/972 72912		2710	56 . SN	126.8E
58 59	220300	24.6N 24.7N	125.3E	LAND		20	50812 73011 25//2:53016	.154	2716	24.3N	
60 61	220300 220300 220400	24.6N 24.6N 24.6N	125.3E	LAND	3	25	5///3 72812			24 . 85 . 35 . 35 . 35 . 35 . 35 . 35 . 35	125.3E 127.8E
63 63	220400	24.6N 24.6N	125.0E 125.1E	LAND)	25	25/12 52711	*1UV	2726	26.3N 24.8N	126.8E 125.3E
64 65	220400	24.6N 24.6N	125.0E	LAND)		25/12 52711 20892 72812 5///3 72812			24.3N 26.3N	124.2E 127.8E 125.3E
66	220500	24 9N	124.9E	LAND	FAIR	45	25//2 52711	MOV	2720	26.35 24.35 26.35 24.35 26.25	125.3E
67 68	220500	24.6N 24.6N	124.9E 124.8E	LAND	•		51552 72811 5///2 72709 55/52 72809			24.3N	124.2E 127.8E
69 70	550600 550600	24.6N 24.6N 24.7N 24.7N	124 . 8E 124 . 8E 124 . 8E 124 . 7E 124 . 6E 124 . 6E 124 . 6E	LAND)	20		MOV	2726	24.50	124.8E 126.8E 125.3E 127.8E 124.2E 125.3E
71 72	220600	24.6N 24.7N 24.7N	124.6E	LAND)		25//2 52816 6///2 72811 65//2 72809 2///3 52711		B. 20	24.3N NE.36 24.8N 24.8N	125.3E
73	220700 220700	24.7N 24.6N	124.6E 124.4E	LAND)		65//2 72809			24.3N	124.2E
74 75 76	220700	24.88	124.5E	LAND	POOR	20		MOV	959E	26.3N	125.3E
76 77 78 79	220800	24.7N 24.7N 24.7N 24.7N 24.7N	124.5E 124.4E 124.4E 124.5E	LAND)		22573 53605 55/12 72809 24823 51705	FIOV	3020	24.8N	126.8E
79	220800	24.7N	124.5E	LAND)		24823 51705			24.3N 24.0N	124.2E
80 81	220900	24.7N	124 2E 124 3E	LAND)		20714 52911 55/12 72709			24.8N 24.3N	121.6E 125.3E 124.2E
83	220900	24.88	124.3E 124.3E 124.2E 124.2E	LAND)		35965 528// 55/12 72909			24.0N 24.3N	121.6E 124.2E 125.3E 125.3E 125.3E
84 85	221000	24.8N 24.7N 24.8N	124.2E 124.1E 124.1E	LAND)	20	22834 52511	MOV	2720	24.8N	125.3E
86 87	221100 221100 221100	24.8N 24.8N	124.1E 124.1E	LAND LAND)	50		MOV	2720	24.8N	125.3E
88 89	221100 221200	24.8N 24.7N 24.8N	124.1E 124.0E 123.9E	LAND			55/12 72809 55/43 52705 52813 72909			24.88	124.2E 125.3E 124.2E
90 91	221200	24.8N	123.85	LAND	GOOD	30		MOV	2730	24.8N	124.2E 125.3E 125.3E
92 93	221200	24.9N 24.8N 24.7N	124.0E 123.7E 123.6E	LAND)		55/43 53111 24852 53309 22993 72809 55/44 52411			24.0N	121.3E
94 95	221200 221300 221300 221300 221400	24.7N	123.6E	LAND)	30	55/44 52411	MOU	2720	24.8N	124.2E 125.3E 125.3E
96 97	221400	24.8N 24.8N	123.8E 123.6E	LAND	GOOD	30	EE /43 E334E	MOV	2720	24.8N 24.8N	125.3E
98 99	221400 221400 221500	24.9N 24.9N 25.1N	123 5E 123 6E 123 4E	LAND			55/43 53215 22913 72808 22912 73011			24.8N 24.3N	125.3E 125.3E 124.2E 124.2E 125.3E
100	221500	79.25 79.25	123.4E 123.4E	LAND			5///4 53308			24.3N 24.8N	124.2E
101	221500 221500 221600 221700 221700	25 2N		LAND	GOOD	30 55		MOV	2720 2920	C7.011	125.3E
103	221700	25.2N 25.4N 25.4N	122.7E 123.1E 123.1E	LAND	GOOD	55	11972 50911	MOV	2920	****	*****
105 106	221700			LAND LAND			5///4 53219 52962 73209			24.8N 24.8N 24.3N	125.3E 125.3E 124.2E
107 108	221700 221700 221800 221800 221800	25.3N 25.4N	122.5E 122.9E	LAND LAND			5///4 53219 52962 73209 11912 52911 6///2 52808				****
109 110	221800 008155	54455555555555555555555555555555555555	122.5E 122.9E 122.8E 122.7E	LAND	GOOD	55		MOV	2720	24.8N 24.8N 24.3N 24.3N 24.3N	125.3E 125.3E 124.2E
111	221800 221800 221900	25.5N	122.7E	LAND			62962 73022 20994 52821 62912 73112			24:0N	161.65
113	221900	25 EN	122.5E 122.7E 122.3E 122.6E	LAND	GOOD	55	6///3 52912	MOV	2720	24.8N	124.2E 125.3E
115 116	221900	25.5N 25.5N	122.3E	LAND			10922 52912			24.8N 27.1N	119.6E
117	222000	25.5N	122.4E	LAND			6///3 52819				125.3E
119	222000 222000 222100 222100 222100 222100	25.5N	125.55	LAND	GOOD	55	10822 52912	MOV	8920	****N 24.8N	*****E
120	555100	25.4N	121.9E	LAND			62913 72812 19822 52912			24,3N ****N	****** 124.3E 124.** 125.3E 124.3E 121.6E 124.6E 124.3E 124.3E
122 123 124	555100	25.6N	122.2E	LAND	FAIR	40		MOV	828	24.8N 25.1N	125.3E
124	555500	25.5N 25.7N	122.2E 121.8E	LAND			6/// 5/// 61912 72811 6/// 5/// 61913 72714 65/62 72611 11812 52912 21812 52615			24,3N	124.2E
125 126 127 128	222200 222200 222300 222300	25.5N 25.4N	121.9E 121.8E	LAND LAND			61913 72714 65/62 72611			24.3N	124.2E
128 129	230000	25.4N 25.4N	121.6E	LAND			11812 52912				*****E
139 130 131	230000 230000 230100	25.4N	121 . 4E	LAND			10055 35815			****N	XXXXXE
132 133	230200	25.5N	121.4E	LAND			21933 62811 21923 72709			24.3N	121.6E
134	230300	25 EN	120 SE	LAND			10812 56816			NE. PS N####	124.2E
136	230400 230500 230700	25.6N	120.6E	LAND			10812 52812			****N	*****E
137	230800	25.68	120.2E	LAND			10812 52811			****N	*****E
139 140	230900	25.7N		LAND			10713 52811 10712 52811 24542 52710			****N ****	*****E
141	231400	25.7N	119.4E	LAND			c4542 52710				*****E

SYNOPTIC FIXES

FIX TIME FIX POSITION INTENSITY DATA (NM) COMMENTS

1 220600 24.5N 124.7E 080 035 47927 47918

TYPHOON ODESSA BEST TRACK DATA

BEST TRA	CK W	ARNING	24	HOUR FORE		48 HOUR	FORECAST	72 HOL	IR FORECAST	
NA	0.000000000000000000000000000000000000	ERT 10.00 0 5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5	0	WIND D6 172 185 185 184 185 185 185 185 185 185 185 185 185 185	0000000141566700000000000000000000000000000000000		NO155 650 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688 1155 688		ERRORS 100 - 00 - 00 - 00 - 00 - 00 - 00 - 00	id M
AVG FORECAST POSIT E AVG RIGHT ANGLE ERRO AVG INTENSITY MAGNIT AVG INTENSITY BIAS NUMBER OF FORECASTS	ERROR 1	15. 146. 238 8. 66. 111 4. 12. 13	3. 272. 1. 128. 3. 13. 2. 9.		TYPHOONS 1 WRNG 24- 13. 146 8. 66 5. 12 -11 35 33	-HR 48-HF . 238. . 111. . 13.	R 35 KTS R 72-HR 272-HR 128. 13. 9.			
DISTANCE TRAVELED BY	TROPICAL CYCLO	NE IS 2328. 1	em .							
AVERAGE SPEED OF TRO	PICAL CYCLONE I	(S 10. H	CNOTS							

TYPHOON ODESSA FIX POSITIONS FOR CYCLONE NO. 12

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE		SITE
1 23 4 5	230007 230512 230512 230954 231032	18.5N 141.2E 18.4N 141.8E 18.2N 141.6E 18.5N 142.0E 18.5N 141.8E	PCN 5 PCN 6 PCN 6 PCN 6 PCN 6	T1.0/1.0 T1.5/1.5	INIT OBS	PGTW PGTW RODN PGTW PGTW
* 6 * 7 * 8 * 10 11 12 13	231200 231248 231600 231757 231757 232053 232312	18.5N 141.0E 18.5N 141.3E 18.5N 142.0E 18.7N 142.3E 18.3N 143.0E 16.7N 143.0E	PCT 7 CT PCT PCT PCT PCT PCT PCT PCT PCT PCT	T1.0/1.0	INIT OBS	PGTW PGTW PGTW PGTW RODN PGTW PGTW
14 15 16 17 18 19	121423088091114230880911423091309130913091309130913091309130913091	288 809 EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	PAPARADADA PARADADA PAPARA	T2.5/2.5 /D1.5/24HRS T2.0/2.0	INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS ULCC FIX ULCC FIX	PĞTÜ PGTÜ PGTÜ RPMK PGTÜ PGTÜ PGTÜ
1456789012344567890123456789012344443	241227 241600 241747 241747 242032 242250	17.7N 144.0E 17.9N 144.0E 18.6N 144.6E 19.6N 144.2E 20.7N 143.9E 21.1N 144.0E	PCC	T2.5/2.5 /D1.5/24HRS	ULCC FIX	PGTW PGTW PGTW PGTW RPMK PGTW PGTW
2233333334 23333333334	250450 250600 250912 250948 251207 251348	22.0N 143.9E 22.2N 143.6E 22.2N 143.2E 22.2N 143.2E 22.7N 142.9E 22.7N 142.8E	.P.C.N. N. B. P.C.N. N. B. P.C.N. N. B. P.C.N. N. B. P.C.N. P.C.N	T4.0/4.0 /D1.5/26HRS		PGTU PGTU PGTU PGTU PGTU PGTU PGTU
35 36 37 38 39 40	251736 251736 251736 252011 252100 252228 260048	23.6N 142.4E 24.0N 142.5E 23.8N 142.4E 24.3N 142.4E 24.4N 142.5E 24.9N 142.6E	PCN 6 PCN 6 PCN 4 PCN 4	T3.5/3.5+/D1.0/24HRS	ULAC 24.4N 142,2E EYE 6 NM	PĞTÜ PĞTÜ RODN PÖTÜ PĞTÜ PĞTÜ
41 42 43 44 45 * 46	260439 260851 260926 261200 261328 261600	25.7N 142.3E 26.4N 142.1E 26.5N 142.0E 27.0N 141.9E 27.2N 141.7E	11300010044 55077777777777777777777777777777777	T5.0/5.0 /D1.0/24HRS T5.0/5.0-/D1.5/24HRS	EYE 12 NM 10 NM RAGGED EYE ELONGATED RAGGED EYE RAGGED EYE ELONGATED EYE ELONGATED EYE EYE WIDTH 13NM 1.FNGTH 15NM	PGTU PGTU PGTU PGTU PGTU PGTU
* 47 48 49	261800 261949 262100	27.5N 141.6E 27.2N 141.1E 27.7N 141.5E	PCN 2 PCN 4 PCN 4	-	EYE WIDTH 12NM LENGTH 15NM RAGGED EYE EYE FIX	PGTU PGTU PGTU

12345678	262206 270027 270300 270429 270600 271011 271200 271300 271300	**************************************	141.0E 140.8E 140.4E 140.2E 140.0E	PCC N D D D D D D D D D D D D D D D D D D	T5 T5	i.5/	5. 5-	∕D0.	5/23HI	RS		EYE 1 EYE 1 CIRCL EYE F INIT EYE F ELONG	NM NM LAR E OBS E IX ATED	YE YE FI: EYE	×		F F F F F	PGTW PGTW PGTW PGTW PGTW PGTW RKSO
60 61 62 63 64	271714 271714	NS.85	139.6E 139.5E 139.1E 139.5E 139.1E	PCN 2 PCN 1 PCN 2 PCN 2 PCN 1	T5	. 0/	5.0	/SØ.	0/24HI	RS		EYE F EYE F EYE F EYE F	IX IX IX IX	VE	v		F F F F	PGTW RKSO RODN PGTW PGTW RODN
65 667 667 669 7723	272325 272325 28000 280300 280417 280690 280949	######################################	139.3E 139.2E 139.8E 138.8E 137.8E 137.9E 137.5E	PCN 11 PCN 12 PCN 22 PCN 12 PCN 22 PCN 22 PCN 22	†5 †4 †5	.0/	5.6	∕W0.	5/24H	RS R	1	INIT INIT EYE F EYE F EYE F EYE F	OBS E OBS IX IX IX IX IX	Ϋ́Ε Zó	าห		F F F F F	RODN RPMK PGTW PGTW RODN PGTW PGTW
74 75 76 77 78 79 80	281200 281248 281600 281800 282048 282303 282347	14955222 200000000000000000000000000000000	137.0E 136.5E 136.3E 136.1E 135.6E 135.2E	PCN 2 PCN 2 PCN 1 PCN 1 PCN 1 PCN 1	T5	5.0/	5.0-	·/S0.	0/24H	RS	:	EYE FEYE FEYE FEYE FEYE FEYE FEYE FEYE	IX IX IX IX IX	ከፐሬ			F F F F I	PGTW PGTW PGTW PGTW PGTW PGTW
81 883 884 886 888 888 888	291968		135.1E 134.9E 134.4E 134.6E 133.6E 133.8E 132.6E 132.6E	PCH 1 PCH 1 PCH 1 PCH 1 PCH 1 PCH 1	74 74	1.5/	4.5	/50. /W0.	0/26H 5/25H	RS RS		EYE F EYE F EYE F EYE F EYE F EYE F	IX IX IX IX IX IX	₩ 4 17			F F I I	RPMK PGTW PGTW RPMK PGTW PGTW
89 90 91 92	291200 291600 291800 292100 292208	30.0N 30.2N 30.4N 30.8N	132.6E 132.1E 130.6E 130.0E 129.1E 128.7E	PCN 6 PCN 6 PCN 6	Т4	4.0/	⁄5.Ø	∕U1	. 0/24H	RS		ULCC	FIX				; ;	PGTW PGTW PGTW
93 94 95 96 97	292241	30.4N 30.4N 30.4N 30.4N	128.7E 128.4E 128.2E 128.0E	PCN 3 PCN 5 PCN 4 PCN 5	тз	3.5/	/3.5	∕W1.	. 0/21H	RS							Î	RODN PGTW PGTW
98 99 100 101 102 103	300108 300538 300600 300900 301042 301121 301200 301348	76.00 76.00 76.00 76.00 76.00 78.00 78.00	17142066627966700337717137726200888886665755555555566666778898898	PCN 56 PCN 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	T3 T4	9.5/ 1.5/	4.5	/W1 /S0	, 0/28H , 0/26H	RS RS		PART EYE 1	EXP L	LCC				RKSO RODN PGTW
104 105 106 107	301348 301600 301824 301824 302100	29.8N 29.7N 29.7N 29.8N	125.0E 125.0E 125.3E 125.3E			3.0/	′4.0-	-∕W1.	. 0/24H	RS								PGTW PGTW PGTW RPMK
108 109 110 111 112 113	302100 310001 310001 310001 310048 310048 310300	29.9N 29.7N 30.4N 30.1N 30.1N	125.7E 126.1E 125.7E 126.1E 126.3E 126.3E	PC	T3	2.5/ 9.0/	/3.5- /3.0	-/W1.	. 0/23н	RS		INIT	OBS				1	PGTW RODN RKSO RPMK RKSO PGTW PGTW
114 115 116 117 118 119	310527 310527 310900 311027	39.7N 39.9N 32.2N 32.5N 32.4N	127.2E 127.6E 128.2E 129.0E 128.8E 129.0E	PCC	та	2.5/	/3.5	∠W1	. 0/24H	IRS								PGTW RPMK PGTW RODN RPMK PGTW
121	311328 311600 311800	30.44 30.54 30.34 34.34 34.34	129.2E 129.3E 129.3E	PCN 4 PCN 6 PCN 6 PCN 5	та	2.5/	/3.0	∕W0	. 5/24H	IRS								PGTW PGTW PGTW RPMK
124 125 126 127 128	010000 010027	35.4N 35.5N 35.7N	131.3E 132.2E	PCN 6 PCN 6 PCN 6		2.0	/2.5	/W0	. 5/24H	IRS		ULCC	FIX					PGTW RODN PGTW RODN
129 130 131 132 133 134 135	010300 010517 010600 011005 011037 011037 011200	36.2N 36.6N 36.7N 37.8N 37.7N 38.0N	132.9E 133.6E 133.6E 136.0E 136.2E 136.3E 136.7E	PCN 6563536 PCN 563536 PCN 53536		1 . 5	/2.5	∕⊌1	. Ø/29H	IRS		ULCC						PGTW RODN PGTW RKSO RODN RKSO PGTW
								AIRCE	RAFT FI	XES								
FIX NO.	TIME (Z)	FIX POSITION	FLT	700MB HGT	OBS MSLP	MA VE	X-SFC L/BRG	-UND ∕RNG	DIR/V	LT-LVL-UNI EL/BRG/RNO	NAV/M	ĔŤ	EYE SHAFE	DIA	E ORIEN- M/TATION	OUT/ IN) MSM ST NO.
i S S	232249 1 240735 1 240836 1	6.9N 143 17.6N 143 17.6N 143	.1E 1500FT .6E 1500FT .6E 1500FT		1000 993 992	5	5 120 5 160 0 020	30 10 15	190	55 120 03	5	2 1 1				+25 +28 +25 +25 +24 +25	+24 +19 +20	2

85	312107	34.9N 130.7E	700MB 3040	35 189	5	210	60 060	60	5 2
29	312318	35.4N 131.5E	700MB 3052	35 300					
		36.9N 133.5E							
30	016263	36.90 133.55	700MB 3097	45 170					
31	010821	37.2M 135.3E	700MB 3086	40 190	35	380	47 180	50	2 20

+11 +12 + 8 +10 +11 + 7 +10 + 9 + 9 + 9 + 9 + 9

						RADA	R FIXES				
FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF		COMMENTS	RADAR POSITION	SITE UMO NO.
0. 1234567890112345678901234567899023333333333445678890112111111111111111111111111111111111	29 400 400 400 400 400 400 400 400 400 40	FOS IT ION 29. 4N 134.76 29. 4N 133.76 29. 4N 133.76 29. 5N 133.76 20. 5N 128.76 20. 5N 12		GOOD GOOD GOOD GOOD GOOD GOOD GOOD GOOD	EYE SHAPE	EYE	RADOB-CODE ASWAR TDDFF 20311 52819 20311 52819 20311 52916 10311 52916 10301 52916 10301 52916 10301 52916 10301 52916 10301 52916 20432 52816 20432 52816 20432 52816 20312 52816 20312 52816 20312 52816 20313 52722 20311 52722 20311 52722 20313 52722 20314 52722 20315 52722 20316 52722 20317 52922 20318 52726 20318 52716 20318 52716 20432 52716	MOV 2825 MOV 3046 MOV 2930 MOV 2830 MOV 2836 MOV 2836 MOV 2946 MOV 2836 MOV 2826 MOV 2826 MOV 2826	COMMENTS	REPAIR R	478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699 478699
#\$44445000000000000000000000000000000000	2323000 2323000 2323000 2323000 2323000 23001000 23001000 23001000 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 2300200 230	30. 44 T. 1. 1227.7 T. 6. 68 15 11 1229.9 T. 10 10 10 10 10 10 10 10 10 10 10 10 10	LAGNODODODO DE PROPERTA DE LA CARACTERIA DEL CARACTERIA DE LA CARACTERIA DEL CARACTERI	GOOD		20 15 30 35 35 30 30 30	21311 53016 20432 52716 20412 52716 20612 52519 22612 52713	MOV 2830 MOV 2820		50	4778999 4778982394 4778982394 477868994 477868994 47786894 4778884 4778884 4778884 4778884 4778884 4778884 4778884 4778884 4778884 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 477888 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47788 47
99999999999999999999999999999999999999	01 0000 01 0000 01 0000 01 01 00 01 01 100 01 01 100 01 02 00 01 02 00 01 02 00 01 02 00 01 02 00 01 03 00 01 03 00 01 03 00 01 03 00 01 03 00	34.30 130 36 46 37 130 36 36 36 37 130 36 36 36 36 36 36 36 36 36 36 36 36 36	LICAGE AND CORRORD COR	GOOD		25	24/1/ 50522 24/51 50522 24/51 50524 118811 50512 118911 50512 12811 50512 12811 50524 12811 50522 12811 50522 11811 50522 11811 50522 11811 50422 12821 50419 11811 50422 3284/ 50522 3284/ 50523 65/// 50524 65/// 50524 65/// 50524 65/// 50524 65/// 50524 55/// 50524 55/// 50524 55/// 50524 55/// 50524 55/// 50524 55/// 50524 55/// 50632 57/// 50632 57/// 50632 57/// 50632 57/// 50632 57/// 50632 57/// 50632 57/// 50632	MOV 0450		139.31.100.100.100.100.100.100.100.100.100.	9136192196296172299999999999999999999999999

130	010600 010600	36.5N 134.5E 36.4N 134.3E	LAND LAND		50730 50922		136.2E 133.1E	47705 47791
132	010600 010700	36.7N 133.9E 36.5N 134.5E	LAND	POOR	50716	35.8N	135.3E 133.1E	47791
134	010700	36.8N 134.8E 36.5N 134.9E	LAND	11111	50632 60725	34.6N	135.7E 136.2E	47773 47705
136	010800	36.8N 134.9E	LAND	65///	50527	35.5N	133.1E	47791
137 138	010900 011000	37.1N 135.5E 37.2N 136.0E	LAND LAND	11111	11111	37.7N	138.8E 138.8E	47572 47572
139	011100 011200	37.3N 136.4E 37.6N 137.0E	LAND LAND		///// /////	37.7N	138.8E 138.8E	47572 47572
141	011300 011400	37.6N 137.8E 37.6N 137.6E	LAND LAND		11111	37.7N	138.8E 138.8E	47572 47572
143	011500 313200	37.7N 138.4E 35.2N 131.4E	LAND		//// 50624		138.8E 133.1E	47572 47791

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON PAT BEST TRACK DATA

BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST				
9827962 21.6 126.6 55.21. 9827182 21.9 127.4 55.21. 9827182 21.9 128.2 55.2 20. 9828802 22.3 128.8 25.5 22. 9828802 22.3 128.9 56.5 22. 9828802 22.3 128.9 56.5 22. 9828802 22.3 128.9 56.7 52.3 23. 9828902 22.3 128.9 57.2 23. 98289062 22.3 6 129.0 5 80 23. 98289062 22.3 6 129.0 5 80 23. 98289182 24.8 129.9 8 82.4 98.39002 25.8 129.1 185.25. 98390002 25.8 129.1 185.25.	3 126.2 45. 22. 6 22. 3 126.2 55. 29 6 22. 3 126.2 55. 29 6 22. 8 127.1 55. 18. 6 22. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 6 25. 7 128.9 7 128.9 7 128.9 7 128.9 7 128.9 7 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 128.9 12	9 125.5 75. 223. 10. 2 8 128.8 75. 53. 5. 2 4 128.6 80. 72. 5. 2 4 129.8 80. 110. 0. 2 9 129.8 85. 126. 5. 2 3 130.7 80. 915. 2 2 131.0 80. 915. 2 2 130.8 90. 120. 0. 2 0 130.6 90. 120. 0. 2 0 130.6 90. 1235. 2 0 130.6 90. 2355. 2 0 130.7 90. 2355. 2 0 130.7 90. 2355. 2 0 127.2 90. 377. 15. 2 0 130.6 75. 182. 5. 2 0 130.6 75. 182. 5. 2 0 130.6 96. 0. 0. 0. 0. 0	4.5 126 7 90 230 5 25 27 7 10 127 3 90 1217 5 27 7 17 10 127 3 90 198 0 28 8 17 1 10 10 10 10 10 10 10 10 10 10 10 10 1	1 123 3 96 485. 9. 2 1244 8 96 485. 15. 5 1244 2 96 463. 5. 6 1244 2 96 545. 15. 6 126 6 96 542. 26. 6 126 6 96 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6				
ALL FORECASTS ALL FORECASTS ALR								

TYPHOON PAT FIX POSITIONS FOR CYCLONE NO. 13

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12345678	241747 250108 251348 252152 252152 260009 260029	23.0N 123.5E 23.3N 124.8E 23.5N 122.0E 23.1N 122.0E 23.1N 121.9E 22.7N 121.9E 22.7N 121.9E	5645555 777777777 999999999	T1.0/1.0 T1.0/1.0 /S0.0/20HRS T1.5/1.5 T1.5/1.5	COMMENTS INIT OBS EXP LLCC INIT OBS INIT OBS ULCC FIX INIT OBS EXP LLCC INIT OBS INIT OBS EXP LLCC INIT OBS EXP LLCC INIT OBS EXP LLCC EYE FORMING INIT OBS DEVELPNG EYE PARTIAL EYEWALL PSBL EYEWALL BANDING EYE LARGE EYEWALL EYE FORMING RAGGED EYE LARGE EYEWALL EYE FIX 18 NM RAGGED EYE 19 NM EYE STADIUM EYE SSNM INNER EYE GN EYE FIX STADIUM EYE SSNM INNER EYE GN EYE FIX SMALL EYE FIX	PGTU PGTU PGTU RPMK RODN RPMK RODN RPMK
90 112 134 1167 1178	261329 2613287 2613347 2621347 270009 270200 270601	22.3N 122.1E 21.3N 124.9E 21.3N 126.0E 21.4N 126.0E 21.4N 126.0E 21.1N 126.1E 21.1N 126.1E	PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP	T2.5/2.5 T2.5/2.5 /D1.0/26HRS	ULCC FIX INIT OBS EXP LLCC INIT OBS	RODU PGODN RODN RPGTU PGTU PGU
100000000000000000000000000000000000000	270900 271911 271200 271449 271600 271856 272009	21.8N 127.1E 21.9N 127.5E 22.1N 127.5E 22.1N 127.5E 22.0N 127.4E 21.7N 128.1E 22.0N 128.1E 22.4N 128.0E	######################################	T3.0/3.0	INIT OBS	RPTTU RPTTU RPTTU RKSO PGTU PGTU RKSO RODI
28991233451 3333335	272325 272325 280000 280149 2803600 280600 280600	23.1N 129.3E 22.7N 129.3E 22.7N 129.3E 23.1N 129.3E 23.1N 129.3E 23.1N 129.4E 23.9N 129.4E 23.6N 129.6E	00000000000000000000000000000000000000	T3.5/3.5 /D1.0/24HRS T3.5/3.5 /D1.0/26HRS T4.0/4.0 /D1.0/24HRS T3.5/3.5	EYE FORMING INIT OBS	ROMN RODU PGTU RPMK PGTU RPMK RKSO PGTU
367839 399 412344	280909 280949 281429 281429 281600 281800 282303	23.5N 129.8E 23.1N 129.8E 23.2N 129.9E 23.1N 129.9E 23.1N 129.9E 23.3N 130.3E 23.3N 130.4E 23.5N 130.4E	4 3 4 5 5 6 4 5 5 PPC 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	T4.0/4.0 /D1.0/24HRS	DEVELPNG EYE PARTIAL EYEWALL PSBL EYEWALL	PGTW PGTW PGTW RODN PGTW PGTW PGTW
45 46 47 489 51 51	282303 290128 290128 290128 290300 290549 290549	23.5N 129.8E 23.6N 130.4E 23.7N 130.5E 23.8N 130.4E 23.8N 130.4E 23.8N 130.4E 23.8N 130.4E	PCN 1 PCN 1 PCN 1 PCN 2 PCN 1 PCN 1 PCN 1	T4.5/4.5 /D1.0/26HRS T4.0/4.0 /D0.5/26HRS T4.5/4.5 /D0.5/27HRS	BANDING EYE FORMING RAGGED EYE LARGE EYEWALL EYE FORMING BANDING EYE RAGGED EYE BANDING EYE	RKSO PGTU RPMK RODNU PGTU RPMU RPMU RODN
554 556 556 559 559	290928 291002 291200 291409 291600 291834 292100	24.0N 130.5E 24.1N 130.7E 24.3N 130.8E 24.3N 130.8E 24.5N 130.9E 24.8N 131.1E 25.3N 131.2E	PCN 2 PCN 2 PCN 2 PCN 2 PCN 1 PCN 2	T4.5/4.5 /D0.5/24HRS	EYE FIX 18 NM RAGGED EYE 19 NM EYE STADIUM EYE 25NM INNER EYE 6N EYE FIX	PGTU PGTU PGTU PGTU PGTU PGTU PGTU
60 61	292208 292241	25.4N 131.4E 25.6N 130.7E	PCN 1 PCN 1	T4.0/4.0 /D0.5/24HRS T5.5/5.5 /D1.5/21HRS	EYE FIX SMALL EYE FIX	RODN RODN

6666667777777788888888889999999999999	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	080 080 090 090 090 090 090 090 090 090	33333333333333333333333333333333333333	4-N04N14+1+104N014440000000000000000000000	T6 T6	4.5/4.5+/S 5.0/S.0 /D 6.0/6.0-/D 5.0/S.0 5.0/S.0-/S	0.5/	28HRS 24HRS			BANDING EYE EYE FIX EYE FIX INIT OBS E ULCC FIX ULCC FIX EXP LLCC EXP	ITHIN EYE YEWALL		TARGET OF TOE
	AIRCRAFT FIXES													
FIX NO.	TIME (Z)	POSITION	FLT LVL	ĤĠT M	SLP V	MAX-SFC-WND VEL/BRG/RNG	DIRA	FLT-LVL- VEL/BRG/	RNG NAV	'/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	OUT/ IN/ DP/	SST NO.
12345678901123456 101123456	260114 27211432 27211432 27211432 27200124 27200124 27200124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2720124 2	1.08.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	1500FT 700MB 1500FT 1500MB 1500FT 700MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB	951 959 8756651 8766651 8888888877888 88888888877888	987 983 976 978 976 977 971 971 961	79 560 565 565 565 565 565 565 565 565 565	050 3080 070 080 140 1330 1350 1350 240 240 240	60000000000000000000000000000000000000	500158500500000 25005585000500000 25005585000500000	2022395334532	CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR ELLIPTICAL GIRCULAR CIRCULAR CIRCULAR CIRCULAR	35 36 38 39 39 39 35 40 25 170 35 25 180 36 36 36	+26 +26 +26 +25 +11 +11 +11 +13 +14 +12 +12 +25 +27 +25 +26 +27 +25 +21 +14 +117 +113 +14 +117 +114 +117 +8 +112 +117 +8 +112 +117 +8 +114 +116 +14 +114 +116 +14 +117 +118 +11 +117 +119 +1	23344556677889996
FIX	TIME	FIX			EYE	EYE	R FIX	B-CODE					RADAR	SITE
NO. 1	(Z)	POSITION	RADAR	ACCRY	SHAPE	. DIĀM	ASWA	R TDDFF 3 42608 2 70811			COMMENTS		POSITION	UMO NO. 47918
274567898127456789812745678982022777777777 444444567898127777777777777777777777777777777777	1821300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 2931300 293	11.5N 123-0-0-1123-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		GOOD GOOD GOOD GOOD		40 40 40 40 40	55/// 55/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 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65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65/// 65///	1 52111	MOV 3 MOV 3 MOV 3	3525 3630 3530 3535			######################################	479137 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 479337 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 47936 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578901234 55566666	3012000 3002000 3002000 3002000 30021200 30021200 300230	31.3N 130.3E 31.7N 130.3E 31.7N 130.3E 31.7N 130.3E 31.6N 130.2E 32.0N 130.3E 32.1N 130.3E 32.6N 130.2E	LAND LAND LAND LAND LAND LAND LAND LAND	GOOD	40 40	20942 53522 2182/ 53624 11912 53622 2455/ 53622 2456/ 53622 23/5/ 53622 23/5/ 53622 20/01 /3622 5/// 53319	3635	31.3N 131.9E 28.4N 129.5E 33.4N 130.3E 30.6N 131.0E 31.3N 131.9E 33.4N 130.3E 30.6N 131.0E 33.4N 130.3E 34.4N 130.5E	47909 47806 47869 47869 47869 47866 47792
65 667 667 669 7123 74	302300 310000 310100 310100 310200 310200 310300 310300	32.7N 130.1E 33.1N 130.2E 33.8N 130.3E 33.5N 130.1E 33.5N 130.2E 33.0N 130.2E 33.0N 130.3E 34.3N 130.3E 34.3N 130.4E		POOR		20411 53611 20//1 43627 529/1 50314 6/// 50222 6/// 50122 60/61 53622		283 4N 139 3E 39 4N 131 9E 31 3N 131 9E 31 3N 131 9E 32 4N 131 9E 33 4N 132 6E 33 4N 132 6E 34 4N 132 6E 35 4N 132 6E 36 5N 132 6E 37 4N 132 6E 38 4N 132 6E 38 4N 132 6E 39 4N 132 6E 39 4N 132 6E 30 5E 31 5E 32 5E 33 5E 34 5E 35 5E 3	47806 47792 47792 47806 47792 47806 47803 47806 47792 47803
75 76 77 78 79 80 81	310400 310400 310400 310400 310500 310500 310600	34.6N 130.4E 34.6N 130.3E 34.8N 130.7E 34.5N 130.2E 35.1N 130.7E	LAND LAND LAND LAND LAND LAND LAND LAND	-		65/41 53622 6/// 51024 65/// 53616 6/// 50222 65/// 53619		34 34 132 36E 33 44 130 3E 35 56 132 3E 35 56 132 3E 35 56 132 3E 35 56 132 3E	47792 47806 47791 47803 47791 47806 47791
8334 885 888 888 888	310600 310800 310800 310900 311000 311100	35.4N 130.7E 35.4N 130.7E 35.4N 131.7E 36.2N 131.4E 36.2N 131.3E 36.5N 131.5E 37.2N 131.8E 37.2N 132.0E	LAND LAND LAND LAND LAND LAND	FAIR		55//2 54038 55//2 54038 50432 45317 55//2 50329 55//2 50327 55//2 50327		33.4N 130.3E 35.5N 133.1E 33.4N 130.3E 35.5N 133.1E 35.5N 133.1E 35.5N 133.1E 35.5N 133.1E	47806 47791 47806 47791 47791 47791 47791

SYNOPTIC FIXES

FIX NO.	TIME (Z)	POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)	COMMENTS
•	010600	41 RN 141.1F	025	996	47431 47544 47423

TROPICAL STORM RUBY BEST TRACK DATA

0827122 22.3 141.2 30 0 0827182 22.3 141.7 40 0 0827182 22.9 142.7 40 0 0828002 23.7 143.6 50 24 0828182 25.7 143.9 50 24 0828182 26.7 143.9 55.26 0828182 26.7 143.9 55.26 0828182 26.7 9 142.6 55.26 0828182 26.9 144.9 55.26 0829002 29.9 144.9 55.26 0829002 39.4 141.9 55.9 20 0829002 39.5 139.8 50 32 0839062 39.5 139.8 50 32 08390122 34.7 139.7 50 34 08390182 36.1 140.1 40 36 0831002 37.6 141.0 45 37	UARNING ERRORS POSIT UIND UIND	0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4B HOUR FORECAST DSIT WINN DST WIND 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 143.3 85. 193. 35. 32. 1 142.3 85. 193. 35. 32. 1 144.16 80 214. 40. 0. 0. 135.3 90. 279. 50. 0. 0. 135.3 65. 423. 20. 0. 0. 136.3 65. 423. 20. 0. 0. 136.3 65. 423. 20. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0.	0 0 -0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPIC AVERAGE SPEED OF TROPICAL (2. 15. 33. 14 10 6 CAL CYCLONE IS 1310. NM	72-HR URNG 24 377. 0. 0 27. 0. 0 40. 0. 0 40. 0. 0	UHILE OVER 35 KTS 4-HR 48-HR 72-HR 0 0. 0 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL STORM RUBY FIX POSITIONS FOR CYCLONE NO. 14

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE		COMMENTS	SITE
1234567	270429 270600 271200 271600 27171800 271800	22.0N 139.4E 22.2N 139.4E 21.8N 140.4E 22.2N 141.9E 22.0N 142.8E 21.8N 142.9E	66666666666666666666666666666666666666	T1.0/1.0		NIT OBS	PGTU PGTU PGTU PGTU RKSO PGTU PGTU RODN
89 10 11 12 13 14 15	272100 272109 280000 280300 280310 280417 280900 280949 281200	201 30 4 5 5 4 1 4 4 4 4 4 5 5 4 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	PCC C C C C C C C C C C C C C C C C C C	T2.5/2.5 /D1.5/6 T2.5/2.5	24HRS I	NIT OBS	PGTU RODN PGTU PGTU PGTU
16 17	281248 281600 281800 282048 282303	26 2N 142 OF	PCN 6 PCN 6 PCN 6 PCN 5	T3.0/3.0 /D1.5/	24HRS F	PART EXP LLCC	PGTU PGTU PGTU PGTU PGTU RKSO RODN PGTU
1990123345678990 2022222222222223	282303 282326 282347	27.0N 142.9E 27.5N 142.8E 27.2N 143.1E 32.0N 140.1E 27.7N 142.6E 28.2N 142.7E	PCN 55 9 FCN	T3.5/3.5 T3.5/3.5 T3.0/3.0 /D0.5/		INIT OBS INIT OBS EYE FORMING	
25 26 27 28	290407 290600 290928 291002 291227	28.9N 142.0E	PCN 6		E	EXP LLCC	PĞTÜ PGTÜ PGTÜ PGTÜ PGTÜ
29 30 31 32	291227 291653 291800 292100 300000	30.5N 140.4E	######################################	T2.5/2.5+/S0.0/	ι	JLCC FIX	PGTW PGTW PGTW PGTW
31 333 335 335 335 339	300356 300538 300600 300900 300940	31.5N 140.0E 32.0N 140.2E 32.9N 139.7E 33.8N 139.6E 33.8N 140.0E 33.8N 139.6E 34.1N 139.5E	PCN 5 PCN 6 PCN 6 PCN 3	T3.5/3.5-/D0.5/ T3.0/3.0	,	INIT OBS	RPMK PGTW PGTW PGTW
40 41	301200 301600	34.7N 139.5E 35.6N 140.0E 36.0N 140.2E 36.8N 140.7E	PCN 6 PCN 6 PCN 6 PCN 6			ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTUU PGGTUU PGGTMK PGGTUU PGGTUU PGGTUU PGGTUU PGGTUU PGGTUU PGGTUU PGGTUU
42 43 44 45	301800 302000 310300 310300 310500 311200 311800 311814	38.1N 141.0E 38.8N 141.6E 39.3N 142.5E 39.6N 143.5E 39.8N 144.7E 40.2N 146.7E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.5/3.5 /W1.0/	26HRS		PGTW PGTH
46 47 48 49 50	311600 311800 311813 311944	40.4N 148.3E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5		INIT OBS ULCC FIX ULCC FIX	PĞTÜ PGTÜ RKSO RKSO PGTÜ
51 52	010000 010600	40.5N 149.9E 41.5N 150.3E 42.1N 155.7E	PCN 6 PCN 6	T1.5/2.5 /W1.0/	/24HRS	EXP LLCC EXP LLCC	PGTW PGTW
				AIRCRAFT	FIXES		
FIX T	IME (Z) P	FIX FLT OSITION LVL	700MB (DBS MAX-SFC-WND MAX SLP VEL/BRG/RNG DIR	(-FLT-LVL-WND ACCRY R/VEL/BRG/RNG NAV/MET	EYE EYE ORIEN- SHAPE DIAM/TATION	EYE TEMP (C) MSN OUT/ IN/ DP/SST NO.
3 3	280020 23 282105 27 282347 27 290532 28	.9N 143.7E 700M .3N 142.9E 700M .8N 142.7E 700M .9N 142.0E 700M	IB 3003 IB 3051 ≤	982 65 320 10 320 07 020 15 190 992 45 310 50 300 40 320 60 090	64 090 29 4 3 37 210 73 6 4	ELLIPTICAL 15 10 090	+ +15 +10 1 +11 +19 + 9 2 +15 +19 + 8 2 +12 +15 +10 3

6 202150 31.7N 140.3E 700MB 3110 398 55 030 30 130 50 030 64 5 3 7 258236 32.2N 140.0E 700MB 3041 45 130 10 100 36 320 62 5 1 CIRCULAR 36 8 300848 34.1N 139.7E 850MB 55 070 47 160 69 060 12 2 3	
RADAR FIXES	
FIX TIME FIX NO. (Z) POSITION RADAR ACCRY SHAPE DIAM ASWAR TDDFF COMMENTS	RADAR SITE Position who no
NO. (2) POSITION RADAR ACCRY SHAPE DIAM ASUAR TDDFF COMMENTS 1 202200 31.7N 140.5E LAND 2000 32.9N 140.2E LAND 3 202330 32.1N 140.2E LAND 3 202330 32.1N 140.2E LAND 3 2000 32.4N 140.2E LAND 3 2000 32.4N 120.5E LAND 3 2000 32.5H 120.5E LAND 4000 32.5H 120.5E LA	9051710N WHO NO STATE OF THE ST

TYPHOON SKIPØ20 BEST TRACK DATA

BEST TRACK	WARNING ERRORS	4 HOUR FORECAST 48	HOUR FORECAST ERRORS	72 HOUR FORECAST ERRORS					
No No No No No No No No	WIND DST WIND POST 13 POST 14 POST 14 POST 14 POST 14 POST 15 POST 1	UIND DST UIND POSITION 13 5 169. 3 45. 16810. 14 0 168. 5 0. 16210. 15 0 167. 5 0. 16210. 15 0 167. 5 0. 16210. 15 0 167. 5 0. 16210. 17 0 167. 8 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0 167. 1 10. 17 0	STATE STAT	OSIT UIND DST UIND 164.6 6.0 . 554. 10. 163.6 27.0 . 668. 26. 161.1 25. 161.6 75. 666. 255. 161.8 3 90. 562. 3 90. 45. 161.8 3 90. 562. 590. 45. 161.8 3 90. 562. 590. 45. 161.5 3 90. 562. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162. 590. 162					
ALL FORECASTS TYPHOONS UHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR WRNG 24-HR 48-HR 72-HR WRNG 24-HR 48-HR 72-HR AVG FORECAST POSIT ERROR 16 129 311 605 16 129 311 605 AVG RIGHT ANGLE ERROR 16 129 311 605 AVG RIGHT ANGLE ERROR 14 14 23 32 473 AVG RIGHT ANGLE ERROR 4 14 23 32 41 14 23 32 AVG RIGHT ANGLE PROPER 6 14 23 32 AVG RIGHT ANGLE PROPER 7 14 23 32 AVG RIGHT ANGLE PROPER 7 15 20 AVG RIGHT ANGLE PROPER 7 20 AVG RIGHT									
AVERAGE SPEED OF TROPICAL CYCLOR									

TYPHOON SKIPØ2C FIX POSITIONS FOR CYCLONE NO. 2

FIX TIME FIX NO. (Z) POSITION ACCRY DVORAK CODE COMMENTS	SITE
FIX TIME NO. (2) POSITION ACCRY DVORAK CODE COMMENTS 1 301804 12.9N 179.9E PCN 6 201804 12.9N 179.3E PCN 6 201804 12.9N 179.3E PCN 6 201804 12.9N 179.3E PCN 6 201804 12.9N 179.8E PCN 6 201806 14.7N 179.8E PCN 6 201806 15.2N 176.8E PCN 6 201806 15.2N 176.8E PCN 6 201806 15.4N 176.8E PCN 6 201806 15.5N 1	PGGTTJJC PGGTTJJC PGGTTJJC PGGTTJC PGGTTC PGGTTC
10 311200 15.2N 176.9E PCN 6 11 311408 15.6N 176.4E PCN 6 12 311600 15.4N 176.7E PCN 6 T3.5/3.5 13 311800 15.6N 176.5E PCN 6 14 311802 15.6N 176.1E PCN 6	KGWC PGTW PGTW KGWC
15 312100 15.5N 176.9E PCN 6	KGUC PGTW PGTW
19 010152 16 0N 176.1E PCN 2 20 010300 15 8N 176.0E PCN 6 21 010600 16 0N 176.2E PCN 6 T3.5/3.5 /D1.0/30HRS 22 010642 16 6N 175.4E PCN 6	KGWC PGTW PGTW KGWC PGTW
24 011126 17.0N 175.9E PCN 2 25 011126 16.9N 176.0E PCN 4 T4.5/4.5 INIT OBS PSBL EYE 26 011438 17.1N 175.5E PCN 6 27 011600 17.0N 175.5E PCN 6 T4.5/4.5 /D1.0/24HRS * 28 011741 17.3N 174.4E PCN 2 29 011800 17.0N 175.5E PCN 6	PGTW KGWC KGWC PGTW KGWC PGTW
19 010152 16.0N 176.1E PCN 2 20 0109300 15.8N 176.0E PCN 6 21 010600 15.0N 176.2E PCN 6 22 010642 16.6N 175.4E PCN 6 23 010900 16.8N 175.7E PCN 6 24 011126 17.0N 175.9E PCN 2 25 011126 17.0N 175.5E PCN 6 27 011600 17.0N 175.5E PCN 6 30 012000 17.5N 175.3E PCN 6 30 012000 17.5N 175.3E PCN 6 31 012025 17.3N 174.6E PCN 6 32 020000 17.4N 175.1E PCN 6 32 020000 17.4N 175.1E PCN 6 32 020000 17.4N 175.1E PCN 6 32 020000 17.4N 175.3E PCN 6 33 020324 17.7N 174.6E PCN 4 34 020324 17.7N 174.6E PCN 6 35 020600 17.8N 174.8E PCN 6 36 020621 17.4N 173.5E PCN 6 37 020900 18.1N 173.5E PCN 6 38 021166 18.1N 173.7E PCN 6 39 021260 18.1N 173.7E PCN 6 40 021620 18.2N 173.8E PCN 6 41 021600 18.2N 173.2E PCN 6 42 021800 18.2N 173.2E PCN 6 43 021800 18.2N 173.2E PCN 6 44 021600 18.2N 173.2E PCN 6 45 021800 18.2N 173.2E PCN 6 47 021800 18.2N 173.2E PCN 6 48 021800 18.2N 173.2E PCN 6 49 021800 18.2N 173.2E PCN 6 40 021800 18.2N 173.2E PCN 6 41 021600 18.2N 173.2E PCN 6	PGTW KGUC PGTW PGTW PGTW PGTW
36 020621 17.4N 173.5E PCN 6 37 020900 18.1N 174.3E PCN 6 38 021106 18.1N 173.7E PCN 6 T4.0/4.5 /W0.5/24HRS 39 021200 18.1N 173.8E PCN 6 40 021427 18.1N 173.5E PCN 6 ULAC 18.7N 173.8E	PGTW KGWC PGTW KGWC
41 021600 18.2N 173.ZE PCN 6 42 021800 18.2N 172.8E PCN 6 T3.5/4.5+/W1.0/26HRS 43 021901 18.3N 172.8E PCN 4 PART EXP LLCC 44 022114 18.3N 172.5E PCN 4 PART EXP LLCC	PGTW PGTW PGTW
45 022205 18.3N 172.6E PCN 4 T2.5/2.5 /S0.0/24HRS EXP LLCC ULAC 19.6N 172.9E 46 030000 18.4N 172.5E PCN 6 47 030312 18.8N 172.1E PCN 6 T3.0/4.0 /W1.0/27HRS 48 030312 18.8N 172.2E PCN 6	PGTW PGTW KGWC
48 030312 18.8N 172.2E PCN 6 49 030600 18.9N 172.1E PCN 4 50 030741 19.1N 171.5E PCN 6 51 030900 19.0N 171.8E PCN 6	PGTW KGWC PGTW
48 030312 18.8N 172.2E	PGTW PGTW KGWC

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                                                                                                                                                                                                                                                                 <b><b>► 5000500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500
                                                                                                                                                                                                                                                                                                 T3.0/3.0 /W1.0/24HRS
T3.0/3.0+/S0.0/21HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EXP LLCC ULAC 21.2N 172.5E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EXP LLCC ULAC 21,4N 173.0E
                                                                                                                                                                                                                                                                                              T3.5/4.0 /W0.5/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ULAC 21.7N 172.5E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ULAC 22.0N 174.4E
                                                                                                                                                                                                                                                                                              T3.5/3.5 /S0.0/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ULAC 22.0N 173.3E
                                                                                                                                                                                                                                                                                                 T3.0/3.0 /S0.0/25HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ULAC 22.0N 174.3E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EXP LLCC ULAC 22.4N 174.2E
                                                                                                                                                                                                                                                                                                T3.5/3.5-/D0.5/27HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PART EXP LLCC ULAC 22.6N 175.
                                                                                                                                                                                                                                                                                                T3.0/3.5 /W0.5/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ULAC 23.9N 172.8E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ULAC 24.8N 174.3E
                                                                                                                                                                                                                                                                                              T3.5/3.5-/50.0/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ULAC 24.6N 174.1E
                                                                                                                                                                                                                                                                                                T2.5/3.0 /U0.5/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EXP LLCC
                                                                                                                                                                                                                                                                                                T4.0/4.0-/D0.5/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 EYE FIX
ULCC FIX
PART EXP LLCC ULAC 27.2N 174.
                                                                                                                                                                                                                                                                                                 T2:5/3.0 /W0.5/25HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ULCC FIX PSBL EYE
PSBL BANDING EYE
ULCC FIX
                                                                                                                                                                                                                                                                                                 T3.5/3.5-/50.0/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EYE FIX
20 NM CIRCULR EYE
EYE 24 NM DIA
EYE FIX
EYE FIX
EYE EYE MAD DIA
EYE FIX
EYE 24 NM DIA
EYE FIX
EYE 24NM DIA
EYE FIX
RAGGED EYE FIX
                                                                                                                                                                                                                                                                                                 T4.5/4.5 /D2.0/24HRS
T5.0/5.0-/D1.0/21HRS
                                                                                                                                                                                                                                                                                                T4.5/4.5 /D2.0/24HRS
                                                                                                                                                                                                                                                                                                 T3.5/3.5-/S0.0/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ULCC FIX
ULCC 36.4N 179.2E
                                                                                                                                                                                                                                                                                                 T3.0/4.0 /U1.5/24HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ULAC 37.2N 180.0E
                                                                                                                                                                                                                                                                                                 T3.0/4.0+/W2.0/27HRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EXP LLCC
```

AIRCRAFT FIXES

FIX NO.	TIME (Z)	POSITION	FLT LVL	700MB HGT	OBS MSLP	MAX-SFC-WND VEL/BRG/RNG			ACCRY NAV/MET	EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
123456789011234567890	31183944278335233515113930 11221708211518393215113931 112217082115189322151 11221708212153932323 112215893212333 112215893212333 112215893212333 112215893212333 112215893212333 112215893212333 11221589321233	17. 2N 175. 6E 17.5N 175. 1E 17.5N 175. 1E 17. 5N 175. 1E 17. 8N 174. 4E 18. 1N 173. 7E 18. 3N 173. 6E 18. 3N 173. 6E 18. 3N 173. 6E 18. 3N 173. 6E 18. 3N 173. 6E 21. 1N 179. 7E 21. 6N 173. 6E 22. 7N 174. 7E 23. 4N 174. 8E 24. 3N 174. 6E 25. 1N 174. 5E 29. 4N 174. 5E 29. 4N 174. 5E 29. 4N 174. 5E 29. 4N 174. 5E	7000MBBBBTTTTTTTSTTTTSTTTTTTTTTTTTTTTTTTT	2930 39553 39553 3976 3113 2982 29880 29880	9792 996 99444 9998 9998 9998 9998 10986 9999 974	75 050 10 75 040 10 35 210 40 55 0320 15 55 0320 20 55 0320 20 55 040 20 55 040 20 55 040 25 55 280 25 80 060 25 80 060 25	360 48 20 20 20 20 20 20 20 20 20 20 20 20 20	35805513002560 14000 120025650 14000 120025650 14000 120025650 14000 12000		CIRCULAR CIRCULAR CIRCULAR CIRCULAR CLLIPTICAL CIRCULAR CIRCULAR CIRCULAR	30 60 60 16 15	+10 +19 +10 +19 +10 +19 +10 +19 +10 +19 +10 +10 +10 +10 +10 +10 +10 +10 +10 +10	2004455677889990011111

TYPHOON TESS BEST TRACK DATA

	BEST TRACK	WARNING _	24 HOL	IR FORECAST	48 HOUR FGRECAST	72 HOUR FORECAST
MO/DA/HI 0E31182 0901002 0901002 0901182 0902002 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 0902122 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090212 090	POSIT 1	OSIT UIND DE	0.0 6.0 1234 3.0 1255 0.0 4.1 1254 3.0 1255 0.0 4.1 1254 3.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255 0.0 1255	ERRORS D	124.3 65 178 -5 178 180.4 75 117 40 117.7 65 129 15 117.7 5 65 41 116.8 70 62 15 115.5 65 106.0 62 15 115.5 65 106.0 62 113.3 8 65 56 -5 113.3 8 65 34 -5 113.3 70 34 -5 112.0 70 30 107 -20	ND POSIT 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
AVG RIGI AVG INTI AVG INTI	ECAST POSIT ERROR HT ANGLE ERROR ENSITY MAGNITUDE ERRO! ENSITY BIAS OF FORECASTS	ALL FOREC URNG 24-H 19. 122. 15. 70. R 3. 12. 2. 1. 22 18		WRNG 2: 21. 12: 15. 6:	8. 56. 118. 0. 12. 23. 2. 7. 11.	
DISTANC	E TRAVELED BY TROPICA	L CYCLONE IS 1	470. NM			
AVERAGE	SPEED OF TROPICAL CY	CLONE IS	11. KNOTS			

TYPHOON TESS FIX POSITIONS FOR CYCLONE NO. 15

FIX NO	TIME (Z)	POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
123456 ***	301348 301800 310048	16.4N 138.6E 14.3N 138.8E 10.9N 136.2E	56556 PCXXXX PCXXX PCXXX	T1.0/1.0	INIT OBS ULCC FIX ULCC FIX INIT OBS	PGTW PGTW PGTW
* 4 * 5	310527 311059	10.5N 134.9E 12.0N 133.2E	PCN 5 PCN 6	T1.0/1.0	INIT OBS	PĞTÜ
6 7 8 9	311600 311813 312100 010027 010300	######################################	PCN 6	T2.0/2.0 /D1.0/28HRS		PGTW PGTW PGTW PGTW PGTW
10	010300	15.4N 131.6E	PCN 6 PCN 6 PCN 6	T1.5/1.5 /D0.5/25HRS		PGTW PGTW
11 12 13 14 15 16	010600 010900 011005 011037	15.1N 129.9E	PCN 6	71107110 720107 BB.IIIO		PGTIJ
14 15		15.6N 129.3E 15.5N 129.2E	PCN 6 PCN 6			PĞTÜ PĞTU PGTU PGTU
16 17	011308 011600	15.5N 128.6E 15.3N 127.8E	PCN 6	T3.0/3.0 /D1.0/22HRS		PGTW PGTW PGTW
18 19	011308 011600 011800 011802	15.0N 126.9E 15.0N 126.9E	PCN 6 PCN 6			PGTW
20 21	012100	14.7N 126.9E 14.6N 126.1E	PCN 6 PCN 4			PGTW PGTU
53	020000 020148 020300	14.6N 125.9E	PCN 4 PCN 3 PCN 6	T3.5/3.5-/D2.0/18HRS T3.5/3.5	INIT OBS	PGTW RODN PGTW
890-1234567890-1234567890 1122222222222333333333333	agatac	14.5N 125.7E	PCN 6	T3.5/3.5	INIT OBS	DOMK
27	020600 020900 020944 021200	14.7N 124.5E	PCN 4 PCN 6			PGTW PGTW PGTW PGTW
29	021200	14.9N 124.1E	PCN 6 PCN 6		ULCC FIX	PGTW PGTW RPMK
31	021429 021600	14.9N 123.5E	PCN 6	T4.0/4.0-/D1.0/24HRS	BLCC FIX	PGTU
33	021751 021751 022100	15.0N 123.1E	PCN 6			RPMK PGTW PGTW
35 36	022224 022255 030000 030128	14.9N 122.9E	PCN 6 PCN 5	T3.5/3.5 /S0.0/18HRS	ULCC FIX	RPMK PGTW PGTW
37 38	030000 030128	15.4N 122.5E 15.2N 122.7E	PCN 6 PCN 5			PĞTÜ RPMK
39 40	030128 030128	15.4N 122.4E 15.7N 122.0E	PCN 5 PCN 6	T3.5/3.5 /S0.0/20HRS T3.5/3.5 /S0.0/25HRS T4.0/4.0 /D0.5/24HRS	ULCC FIX	PGTW RODN
41 42 43 44	030600 030636	16.5N 122.4E 16.5N 122.1E	₽®₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽		ULCC FIX	PGTU RODN
43 44		16.8N 122.4E	PCN 6 PCN 4			PGTW Rodh
45	031104 031134 031409 031600	17.1N 121.2E 17.3N 120.0E	PCN 5 PCN 6			RPMK PGTW
46 47 48 49 50	031600 031800 031923	17.1N 119.8E 17.2N 119.3E	PCN 6 PCN 6	T3.0/4.0+/W1.0/26HRS		PGTW PGTW
50 50	031923 032100 040000	17.6N 119.2E	PCN 5			RPMK PGTW PGTW
51 52 53	040000 040014 040108	17.9N 118.5E	PCN 5	T3.5/3.5+/S0.0/24HRS T3.0/3.5+/W0.5/24HRS	ULCC FIX	RPMK
54 55	040108 040249 040300	18.2N 117.7E	PCN 6	CARPANC, BWITC, END, C.		PGTW RPMK PGTW
56	040600 040900	18.7N 116.8E	1919		ULCC FIX	PGTW PGTW
57 58 59	041043 041113	19.3N 116.2E	PCN 6 PCN 5 PCN 6			RPMK RKSO
60 61	041200 041530	19.3N 115.7E 19.0N 115.3E	PCN 6 PCN 4		EXP LLCC	PGTU RODN
					=	

123 4 022 022 022 022 022 022 022 022 022 0	FIX TI	4 026 6 026 7 026 8 036 * 9 036 * 10 046	FIX TI		690 05500 05500 05500 05500 055511220 055511220 055511220 05511220 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520 05520
118300 118300 128300 128300 1283000000 12830000000 1283000000000000000000000000000000000000	IME	20544 20826 22151 30515 32134 40027 40645	IME Z)	3270	00200000000000000000000000000000000000
25 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 1	FIX POSITION	15.1N 132.6E 14.7N 126.6E 14.7N 126.3E 14.7N 126.3E 14.7N 126.3E 14.7N 124.9E 15.7N 123.5E 15.6N 123.4E 16.6N 123.4E 19.0N 119.1E 19.5N 118.0E 18.8N 116.7E 18.8N 116.4E	FIX POSITION	_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	19 19 19 19 19 19 19 19 19 19 19 19 19 1
RADAR ACCRY LAND LAND LAND LAND LAND LAND LAND LAND	RADAR ACCRY	1500FT 1500FT 1500FT 1500FT 1500FT 700MB 2938 700MB 2946 700MB 2946 700MB 2988 700MB 2988 700MB 2988	FLT 700H LVL HGT		114341414424046666CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
SHAPE	EYE	989 50 987 450 983 65 65 31 992 48	B OBS MAX MSLP VEL		T4.0/4. T4.5/4.
4	EYE	20 20 215 140 104 209 140 209 140 209 209 209 209 209 209 209 209 209 20	-SFC-WND		0 /S0.0.0 0-/D0.5 5 /D1.5
1060/ 4/// 1061/ 42905 1061/ 52910 1161/ 3296 1062/ 53215 1161/ 53214 1062/ 42902 12726 4/// 1042/ 43505 1241/ 43511 1042/ 43410 11501 /////	FIXES	170 40 060 280 36 210 210 42 140 040 50 340 190 47 090 260 53 140 100 62 360 130 65 030 040 47 310 140 54 060 160 61 080 150 43 040	MAX-FLT-LVL- DIR/VEL/BRG/		∕26HRS ∕26HRS
SPECIAL STATE OF STAT		5 12 4 60 6 22 10 10 2 15 20 10 1 11 2 3 12 3 12 3 12 3 12 3 12 3 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 1	UND ACCRY RNG NAV/MET		EYE OPN PSBL EYE PSG GE RAYEBL RAYEBL RAYEBL RAYEBL RAYEBL RAYEBL RAYEBL PSBL RAYEBL
OMMENTS Y CIRCLR D T CIRCLR D T CIRCLR D T CIRCLR S DIA 360-38 NT CIRCULR		CIRCULAR	EYE SHAPE		EYE EYE BYE ED EYE ED EYE FIX EYE EYE ED EYE
		10	EYE ORIEN DIAM/TATIO		A A
16.3N 120.6E 16.3N 120.6E 18.4N 121.6E 18.4N 121.6E 18.4N 121.6E 18.4N 121.6E 18.4N 121.6E	PADAD	+ 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24	- EYE TEMP N OUT/ IN/ DF		
98321 98321 98321 98321 98321 98321 98321 98321 98321 98321 98321 98321	SITE	27 27 27 25 25 56 67 89	(C) MSN P/SST NO.	PGTW	RESCRIPTION OF THE PROPERTY OF

HOTICE - THE ASTERISKS (\$) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL STORM VAL BEST TRACK DATA

091318Z 14.7 140.8 25 6 091318Z 15.4 139.7 25 6 091400Z 16.2 138.5 25 6 091400Z 16.2 138.5 25 6 091402Z 18.4 139.7 30 6 091418Z 18.4 136.1 30 6 0915418Z 18.2 133.9 30 6 091500Z 18.1 132.0 35 18 091506Z 19.5 139.6 40 15 091518Z 21.2 127.0 45 26 091518Z 21.2 127.0 45 26 091618Z 21.2 127.0 45 26 091618Z 21.2 123.0 50 21 091618Z 21.2 123.0 50 21 091618Z 21.3 121.2 50 21 091700Z 21.4 120.6 45 21 091700Z 21.4 120.6 45 21 091718Z 21.7 118.9 35 21 091718Z 22.0 117.6 30 21	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	WIND POSIT WO NO. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERRORS DST WIND POSIT WI -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0.0 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0.0 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0. 0 -0. 0.	ERRORS ND DST WIND -0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROP AVG INTENSITY MAGNITUDE ER AVG INTENSITY BIAS NUMBER OF FORECASTS	13 16. 13 9 ICAL CYCLONE IS 163	TS -HR 72-HR 129. 249. 129. 249. 28. 70. 28. 70. 28. 70. 5 1	TYPHOONS WHILE OVE WRNG 24-HR 48-H 0 0 0 0. 0 0. 0. 0 0. 0. 0 0 0. 0 0 0.		

TROPICAL STORM VAL FIX POSITIONS FOR CYCLONE NO. 16

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	c	OMMENTS	SITE
* 1	122100	11.4N 146.9E	PCN 6 PCN 5	T1.0/1.0	INIT	OBS	PGTU PGTU
* 3	122346 130300 130449	9.0N 143.6E 14.2N 141.6E	PCN 6 PCN 6 PCN 6	T1.0/1.0	INIT	OBS	PGTW PGTW PGTW
6	130449 130600 130912 131200	14.4N 141.4E 14.6N 141.4E	PCN 6	T1.5/1.5	****		PGTW
9 10	131734	15.2N 139.9E 15.0N 139.8E	PCN 6 PCN 6 PCN 6	11.5/1.5	INIT	OBS	PGTW PGTW PGTW
12	140000	16.3N 138.6E 16.7N 138.3E	PCN 6 PCN 5				
15 16	140438 140600	17.1N 137.8E 17.4N 137.1E	PP	T1.5/1.5 /D0.5/24HRS			PGTW PGTW PGTW
17 18 19	1311000708800008 113121000708800008 11313140010000 1140010000008 114001000000 11400100000000 11400000000	17.9N 136.8E 19.1N 136.4E 18.7N 136.2E	PCN 6 PCN 6 PCN 5 PCN 5	T2.0/2.0 /D0.5/26HRS	ULCC ULCC ULCC	FIX FIX FIX	PGTW PGTW PGTW PGTW PGTW PGTW PGTW PGTW
20 21 22	141724 141800 142100	18.7N 135.6E 18.8N 134.5E 17.9N 134.0E	PCN 5 PCN 6 PCN 6	T2.0/2.0 /D0.5/26HRS	ULCC ULCC ULAC	FĪX FIX FIX	PĞTÜ PGTU PGTU
23 24 25	142131 150000 150047	17.6N 133.5E 17.7N 132.2E 18.0N 131.2E	PCN 6 PCN 6 PCN 6 PCN 4				PGTU PGTU PGTU
26 27 28	150300 150600 150609	18.8N 131.1E 20.4N 130.6E 20.4N 130.4E	PCN 6 PCN 6 PCN 6	T2.5/2.5+/D1.0/24HRS	ULAC	FIX	PGTU PCTU
29 30 31	150900 151011 151200	20.2N 129.8E 20.3N 130.0E 20.6N 129.4E	PCN 6 PCN 6 PCN 6 PCN 6	T3.0/3.0 /D1.0/22HRS	ULCC ULCC ULCC ULCC ULCC	FIX FIX FIX	PĞTÜ PGTÜ PGTÜ PGTÜ
32 33 34	151328 151600 151800	20.9N 129.1E 21.0N 127.9E 21.2N 127.5E	PCN 5 PCN 6 PCN 6	T3.0/3.0 /D1.0/22HRS	ULCC ULCC ULCC	FIX FIX FIX	PGTU PGTU PGTU PGTU PGTU
147456789010745678901074567	155126005550008800880009000 155116888510008800980090 15512688811000805550050440000 16600080095140000 16600050901410000 166016118100 166016116111111111111	21.7N 127.2E 22.0N 127.2E 20.9N 126.8E	PCN 5 PCN 5 PCN 6		ULCC	FIX	RPMK RODN PGTU
* 38 39 40	160000 160208 160208	22.2N 125.8E 21.4N 124.3E 21.3N 124.6E	PCN 6 PCN 3 PCN 3 PCN 4	T3.5/3.5 T2.5/2.5-/S0.0/24HRS	ÜLCC INIT FXP	FIX OBS EXP LLCC	PGTW RPMK
41 42 43	160300 160558 160558	21.3N 124.1E 21.2N 123.3E 21.1N 123.0F	PCN 4 PCN 4 PCN 3	T2.5/2,5-/S0.0/24HRS	EXP EXP	LLČČ LLČČ	PGTW PGTW PGTW RPMW PGTW PGTW PGODN
42 43 44 45 46	160900 160950 161200	21.0N 122.6E 21.0N 122.4E 21.0N 121.9F	PCN 6 PCN 6 PCN 6		Enr		PGTW PGTW
47 48 49	161449 161600	21.2N 121.0E 21.1N 121.0E 21.2N 120.3E	PCN 6 PCN 6 PCN 6	T3.0/3.0 /S0.0/24HRS			RODN PGTU
50 51	162100	20.9N 121.1E 21.4N 121.0E	######################################	T3 E73 E 750 0734UDC	EXP	LLCC	PGTU PGTU PGTU PGTU
52 53 55 55 56 57 58	170300 170548	21.6N 120.4E 22.2N 120.2E	PCN 6	T3.5/3.5 /S0.0/24HRS T3.0/3.0-/D0.5/24HRS	Euc		PGTW RPMK PGTW RPMK
56 57	170600	21.5N 120.0E 21.7N 119.8E	PCN 4 PCN 6 PCN 5		EXP EXP	LLCC	PGTW PGTW PGTW
* 60 * 60	170000 1700148 17005488 17006000 17011100 1711208 1711428 17118000	######################################	PCN 6 PCN 6 PCN 6	74 5.0 4 30. 5.0 3.			PGTW PGTW PGTW RPMK PGTW RODN PGTW
61 62 63 64	171800	21.8N 118.4E 21.9N 116.8E	PCN 6 PCN 6 PCN 5	T1.5/3.0 /W1.5/24HRS	EXP	LLCC	PGTW
64	180011	23.1N 116.2E	PUN 5				RPMK

AIRCRAFT FIXES

TROPICAL STORM WINONA BEST TRACK DATA

BEST TRACK MO/DA/HR POSIT WIND POSIT 091900Z 14.8 115.0 25 0.0 0 091946Z 15.5 114.7 25 0.0 0 091918Z 16.2 114.2 25 0.0 0 091918Z 16.7 113.3 25 16.4 113 092006Z 17.3 112.7 30 16.6 113 092006Z 17.3 112.7 30 16.6 113 092006Z 18.8 112.0 30 17.8 113 092018Z 18.8 112.0 30 17.8 113 092018Z 10.5 111.4 50 20 1 111 092118Z 20.9 111.4 50 20 1 111 092118Z 20.9 110.5 45 20.7 110 092200Z 21.2 110.2 35 21.7 110	ERRORS 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERRORS 0 -0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CY AVERAGE SPEED OF TROPICAL CYCLON		TYPHOONS WHILE URNG 24-HR 0 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	: OVER 35 KTS 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL STORM WINONA 'FIX POSITIONS FOR CYCLONE NO. 17

						5	112 11/123		
FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK	CODE		COMMENTS		SITE
123456	180300 190000 190249 190300 190600	10.6N 114.6E 14.6N 114.8E 15.6N 114.9E 15.2N 115.0E 15.9N 114.4E	PCN 66 PCN 56 PCN 66 PCN 66	T1.0/1. T1.0/1 T2.5/2	. 0		ULCC FIX INIT OBS INIT OBS ULCC FIX		PGTW PGTW RPMK PGTW PGTW PGTW
4 56 7 8 9 0	191200 191600 191800 192100	16.2N 113.9E 15.9N 113.8E 16.3N 113.3E 16.6N 113.2E	PCN 6 PCN 6 PCN 6	T2.5/2	. 5		ULCC FIX ULCC FIX INIT OBS ULCC FIX ULCC FIX ULCC FIX		PGTW PGTW PGTW PGTW PGTW
11 12 13	192307 192307 200000	16.6N 113.8E 16.4N 112.8E 16.5N 113.3E 16.5N 113.8E 16.5N 112.9E	PCN 5 PCN 6 PCN 3 PCN 4	T2.0/2 T2.5/2	.0 /D1	.0/20HRS	ULCC FIX INIT OBS ULCC FIX		RPMK RODN PGTW RPMK
14 15 16 17	200228 200300 200600 200900	16.5N 112.9E 17.6N 112.7E 17.6N 112.7E 17.8N 112.7E 18.1N 112.8E	PCN 4	T2.5/2	.5-/50	0.0/24HRS			PGTW PGTW PGTW
18 19 20 21 22	201200 201600 201800 201942 202100	18.5N 111.8E 18.9N 111.4E 19.1N 111.4E 19.2N 112.0E 19.4N 111.5E 19.4N 111.6E 19.4N 110.9E	PCCCCC PCCCCC PCCCCC PCCCCC	T2.0/2	.5-/⊌0	0.5/25HRS	EXP LLCC		PĞTÜ PGTU PGTU RODN PGTU PGTU
10045678 1000000000	210000 210046 210208 210300 210600 210646	19.4N 112.0E 19.4N 110.0E 19.5N 111.9E 20.0N 111.7E 20.2N 111.5E	PCN 6 PCN 6 PCN 6	T3.0/3 T3.5/3	.0 /D1 .5-/D1	.0/24HRS .0/24HRS			RODN RPMK PGTW PGTW RODN
28 39 31 31	210900 211126 211126 211200	20.2N 111.5E 20.4N 110.6E 20.5N 111.3E 20.4N 111.2E	PCN 6 PCN 5 PCN 5 PCN 7 PCN 6				PSBL EYE		PGTW RPMK RODN PGTW
33 34 35 36 37 38	211449 211600 211800 211932 212100 212225	10.99EHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH	PCN 3 PCN 6 PCN 6	T3.0/3	.0-/D1	.0/24HRS			RPMK PGTW PGTW RODN PGTW RPMK
39 40 41	220000 220024 220148 220300	21.2N 110.5E 21.7N 110.6E 20.9N 109.9E 21.3N 110.2E	PCN 465 PCN 6565 PCN 6570 PCN 6670						PGTW RPMK RKSO PGTW
42 43 44 45 47	220600 220636 220900 221105 230000	21.6N 110.1E 21.6N 110.0E 21.9N 110.2E 22.3N 110.1E 22.7N 110.6E	965656 PPPPP				ULCC FIX ULCC FIX ULCC FIX		PĞTÜ RKSO PGTW RKSO PGTW
					RADA	R FIXES			
FIX NO.		FIX POSITION RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TDDFF	COMMENTS	RADAR POSITION	SITE WMO NO.
123456789012334567	192100 1 192200 1 192300 1 1200000 1 200100 1 200200 1 200200 1 200400 1 200500 1	6 9 N 112 2 GE LARND BODD BODD BODD BODD BODD BODD BODD BO				21442 52996 21442 52906 21562 52906 21562 53206 10422 53206 10422 53506 24352 53506 24352 53506 24352 53506 24562 535064 24562 53604 24562 53604 24562 53604 24562 53604 24562 53604 24562 53604 24562 53604 24562 53604 24562 53604 24662 53604 24763 53604 24763 53604 24763 53606		6.8N 112.3E 16.8N 112.3E	981 59981 59981 59981 59981 599981 599981 599981 599981 599981 59981 59981
18 19	201500 1 201700 1 201800 1	8.6N 111.9E LAND 8.7N 111.9E LAND 9.0N 111.9E LAND 9.0N 111.8E LAND				24643 53408 24459 83306		16.8N 112.3E 16.8N 112.3E 16.8N 112.3E	59981 59981

SYNOPTIC FIXES

FIX TIME FIX POSITION INTENSITY NEAREST DATA (NM) COMMENTS

 1
 211800
 20.7N
 110.SE
 040
 030
 56658
 59647
 59754

 2
 220000
 21.2N
 110.2E
 040
 010
 59658
 59647

 3
 220600
 21.6N
 110.2E
 035
 025
 59658
 59446



BEST T MO/DA/HR POSIT 0927002 18.4 117 0927062 18.6 116	WIND POSIT .3 25 0.0 0.	WARNING ERRORS WIND DST WIND 0 00. 0. 0 00. 0.		ERRORS D DST WIND PO -0. 0. 0.0	48 HOUR FORECAST ERROR DSIT WINI DST WI 0.0 0 -0. 0 0.0 0 -0.	ND POSIT WIND DST WIND
992712Z 18.7 116 992718Z 18.9 115 992806Z 19.2 115 992806Z 19.2 114 992812Z 19.0 113 992818Z 18.8 112 992906Z 18.7 112	.0 30 0.0 0. .5 30 0.0 0. .0 30 0.0 0. .4 35 19.5 114. .7 40 19.3 114. .9 45 18.9 113.	4 30. 18. ~5. 0 40. 25. 0. 0 45. 8. 0. 2 50. 6. ~5.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	-0. 0. 0.0 -0. 0. 0.0 11720. 20.5 8720. 19.6 4010. 19.2 315. 18.6	0.0 0 -0 0 0.0 0 -0 0 110.2 45 156 -20 109.8 50 120 -15 107.8 50 72 -20 107.8 50 42 -20	. 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0
99296Z 18.7 11 99291ZZ 18.7 110 99291ZZ 18.5 110 993000Z 18.5 100 99300Z 18.1 108 99301ZZ 18.1 107 100100Z 18.2 107	70 18.8 110. 11 65 18.5 110. 14 65 18.3 109. 19 65 18.2 108. 14 65 18.1 108. 15 65 18.1 108. 16 65 18.0 107.	9 65. 135. 0 65. 6. 0. 4 65. 0. 0. 3 65. 11. 0. 3 65. 6. 0. 9 70. 8. 0.	18.7 109.2 60 18.9 108.5 55 18.4 107.1 70 18.4 106.8 70 17.9 106.3 70 17.7 105.9 50 18.1 104.5 30	4810. 18.8 44. 0. 18.5 26. 0. 18.5 26. 5. 0.0 6. 20. 0.0 6. 10. 0.0	107.0 70. 57. 5 106.1 65. 61. 15 104.2 40. 103. 0 104.3 30. 87. 5 0.0 0 -0. 0 0.0 0 -0. 0 0.0 0 -0. 0	. 0.0 0.0 00. 0. . 0.0 0.0 00. 0.
1001062 18.0 106 1001127 17.8 106 1001187 17.7 105 1002007 17.5 105	1.7 65 18.1 106. 1.3 50 17.9 106. 1.8 40 17.7 105.	5 65. 13. 0. 2 50. 8. 0. 8 40. 0. 0.	0.0 0.0 0. 0.0 0.0 0. 0.0 0.0 0. 0.0 0.0	-0. 0. 0.0 -0. 0. 0.0 -0. 0. 0.0	0 0 0 -0 0 0 0 0 -0 0 0 0 0 -0 0	. 0.0 0.0 00. 0. . 0.0 0.0 00. 0. . 0.0 0.0 00. 0.
AVG FORECAST POSI AVG RIGHT ANGLE E AVG INTENSITY MAG AVG INTENSITY BIA NUMBER OF FORECAS	T ERROR RROR NITUDE ERROR	9. 44. 8 6. 30. 6 1. 9. 1 -13	-HR 72-HR 7. 120. 3. 84. 3. 18. 6. 5.		9. 63. 91. 9. 14. 12. 385.	
DISTANCE TRAVELED	BY TROPICAL CYC	LONE IS 705.	NM			
AVERAGE SPEED OF	TROPICAL CYCLONE	is 6.	KNOTS			

TYPHOON ANDY FIX POSITIONS FOR CYCLONE NO. 18

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234	900200784777003308080099008001009900800080770880060050800000111118688688888888888888	99E W # E B # E # E # E # E # E # E # E # E #	PCN 5 PCN 6 PCN 6 PCN 6	T2.0/2.0	INIT OBS PART EXP LLCC PART EXP LLCC PART EXP LLCC PART EXP LLCC INIT OBS ULCC FIX INIT OBS PART EXP LLCC INIT OBS ULCC FIX EYE FIX ULCC FIX	RKSO PGTW PGTW PGTW
* 6 7	270600 271100 271827	18.5N 116.5E 19.1N 113.9E 18.6N 114.9E	PCN 4 PCN 6 PCN 5	T1.0/1.0	PART EXP LLCC INIT OBS ULCC FIX	PGTW RPMK RKSO
8 9 10	272158 272354 280127	19.0N 115.4E 19.2N 115.3E 19.6N 114.6E	PCN 3 PCN 3 PCN 5	T1.5/1.5 /D0.5/11HRS T2.5/2.5 T3.0/3.0 /D1.0/26HRS	INIT OBS PART EXP LLCC	RPMK RODN PGTU
11	280127 280300	19.6N 115.2E 19.3N 114.5E	PCN 3 PCN 6	T2.0/2.0	INIT OBS	RKSO PGTU
14 15	280713 280900	18.5N 114.2E 18.6N 113.8E	PCN 5	T2.0/2.0 /D1.0/20HRS	ULCC FIX ULCC FIX ULCC FIX	RPMK PGTW
17 18	281038 281200 281408	19.4N 114.8E 19.0N 113.7E 19.0N 113.2E	PCN 5 PCN 5		ULCC FIX	PGTW RODN
20 21	281600 281800 281959	18.8N 112.8E 18.7N 112.7E 18.4N 112.5E	PCN 6 PCN 6 PCN 3	T3.5/3.5	INIT OBS ULCC FIX ULCC FIX	PGTW PGTW RPMK
890120456789012034567890120345678901203456789012034567	282100 290000 290248 290300	18.7N 112.7E 18.6N 112.2E 18.7N 112.1E 18.6N 111.7E	PCN 6 PCN 4 PCN 1 PCN 4	T4.0/4.0 /D1.5/27HRS T4.0/4.0 /D1.0/26HRS	EYE FIX	PGTW PGTW Rodn PGTW
26 27 28	290600 290721 290900	18.6N 111.5E 18.9N 111.5E 18.9N 111.0E	PCN 4 PCN 1 PCN 2		EYE FIX EYE FIX	PGTW RODN PGTW
29 30 31	291200 291529 291600	18.8N 110.9E 18.6N 110.4E 18.6N 110.2E	PCN 2 PCN 1 PCN 2	T4.5/4.5-/D1.0/24HRS	ĒYĒ FĪX EYE FIX EYE FIX	PGTW RODN PGTW
32 33 34	291800 291948 292100	18.5N 110.2E 18.6N 109.9E 18.4N 109.7E	PCN 2 PCN 1 PCN 2		ĒYĒ FĪX EYE FIX FYF FIX	PGTW RODN PGTW
35 36 32	300000 300228 300300	18.3N 109.4E 18.1N 109.2E	PCN 2 PCN 1 PCN 2	T4.5/4.5 T4.5/4.5	ĒÝĒ FÍX INIT OBS EYE FIX FVF FIX	PĞTÜ RPMK PGTU
38 39	300600	18.2N 108.7E 18.1N 108.7E	PCN 2 PCN 3	7,707,710 7 BO. 37 B NING	EÝE FÍX	PGTW RPMK
41	301137	18.1N 108.5E 18.1N 109.1E	PCN 3		ĔŸĔĬĸŶ	RPMK RODN
44 45	301508	17.9N 108.2E 18.1N 108.2E	PCN 4 PCN 6	74 044 E. (110 E.) CURC	ULCC FIX	RODN PGTW
47 48	301936	18.1N 107.9E 18.4N 107.8E	PCN 5	14.0/4.5~/W0.5/26HK5		RODN PGTU
50 51	010000 010208	18.3N 107.2E 18.1N 107.3E 18.3N 107.2E	PCN 5 PCN 5	T3.5/4.5 /W1.0/24HRS	ULCC FIX	PGTW RPMK
52 53 54	010300 010600 010640	18.2N 106.5E 18.2N 106.5E	PCN 6 PCN 6 PCN 5	T3.0/3.5 /W1.5/24HRS		PGTW PGTW RPMK
55 56 57	010900 011115 011116	18.0N 106.4E 17.9N 106.4E 17.6N 106.7E	PCN 6 PCN 5 PCN 5		ULCC FIX PART EXP LLCC	PGTW RODN RPMK
58 59 60	011200 011448 011926	17.8N 106.3E 17.6N 106.6E 16.9N 106.1E	PCN 6 PCN 5 PCN 5		ULCC FIX ULCC FIX	PGTW RPMK RODN

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR AC	EYE CRY SHAPE	EYE RADOB-C DIAM ASWAR 1		COMMENTS	RADAR POSITION	SITE UMO NO.
10745678901274	260200 281400 2815000 2815000 2815000 2815000 28823000 28823000 29902000 29902000 29902000 29903000	17.7N 122.0E 18.8N 112.8E 18.8N 112.7E 18.7N 112.7E 18.7N 112.5E 18.7N 112.4E 18.6N 112.2E 18.5N 112.4E 18.5N 111.8E 18.6N 111.8E 18.6N 111.4E 18.8N 111.4E 18.8N 111.3E 18.8N 111.3E	LAND LAND LAND LAND LAND LAND LAND LAND		1096/ 21382 21632 11482 24542 12412 11184 10384 11375 24832 14512 14512 22641	32811 52706 53206 53206 53206 52806 52707 52806 52206 52806 52806 52808 52808	60 PRONT CIRCLE OPN	5 16 3N 120 6E 16 8N 112 3E 16 8N 112 3E	989981 599981 599981 599981 599981 599981 599981 599981 599881 59981
					SYNOPTIC FIXES	s			•
FIX NO.	TIME (Z)	FIX POSITION	INTENSIT ESTIMATE		cor	MMENTS			
1 2	281200 291500	18.2N 113.3E 18.5N 110.4E	040 065	040 055	59981 AND SHIP 59948 59855 59	PS 9981 59838 59	9845		

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TYPHOON BRENDA BEST TRACK DATA

BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST
922962 16.7 132.9 20 0 922912Z 16.5 132.3 20 0 922912Z 16.5 132.3 20 0 922913Z 16.4 131.6 25 16. 933002Z 16.1 131.0 25 16. 933012Z 16.1 130.4 35 15. 933012Z 16.1 130.4 35 15. 933013Z 16.3 130.1 4515. 100100Z 16.7 129.9 55 16. 100100Z 17.4 129.6 60 17. 100112Z 17.9 128.6 60 18. 100110Z 17.7 128.6 60 18. 100110Z 17.7 128.6 65 17. 10020Z 17.8 128.2 75 18. 10020Z 18.4 18.4 18.4 18.4 18.4 18.4 18.4 18.4	4 1306.9 25. 19. 0 166 8 129.6 37. 25. 19. 0 155 8 129.6 37. 25. 19. 0 155 8 129.6 37. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18. 25. 18.	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8.3 121.6 80 2245. 9.0 120.0 75. 25915. 8.4 119.7 55. 28335. 7.5 121.7 560. 34130. 8.1 121.0 60. 40130. 8.9 121.2 75. 43315. 2.8 119.0 95. 377. 10. 0.5 118.8 90. 627. 10.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPIC	-1. 0. 1. 23 19 15		NS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 93. 245. 436. 43. 106. 230. 6. 8. 17. 0. 16. 19 15 11	
AVERAGE SPEED OF TROPICAL C	CYCLONE IS 11. KNO	ors		

TYPHOON BRENDA FIX POSITIONS FOR CYCLONE NO. 19

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4	251600 260300 261200	5.3N 156.6E 8.3N 156.3E 9.9N 152.3E 10.8N 145.9E 13.4N 144.2E	PCN 6 PCN 6 PCN 6 PCN 6	T0.5/0.5 T1.5/1.5	INIT OBS INIT OBS ULCC FIX	PGTW PGTW PGTW PGTW
756789	261656 261658 262038 270359 271247 272213 272346 280000	13.4N 144.2E 15.1N 143.1E 14.9N 141.7E 14.5N 140.2E	PON 6	T0.5/0.5 T1.5/1.5 T1.0/1.5+/W0.5/24HRS	INIT OBS INIT OBS ULCC FIX	PGTW PGTW PGTW PGTW
10	272346 280000 280300 280900	15.0N 140.2E 15.3N 139.7E 16.9N 139.0E 16.9N 138.9E	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5 /D0.5/23HRS	ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW PGTW PGTW
112345678901234567	280300 280300 282300 29000 2900300 290520 290520 291017 291347	16.6N 137.3E 16.5N 137.1E 17.1N 134.4E 16.3N 133.5E	######################################	T1.5/1.5+/S0.0/24HRS		PĞTÜ PGTU PGTU PGTU
18 19 20 21	290900 291017 291200 291347 291600 291806	17.0N 132.9E 17.1N 132.9E 16.9N 132.4E 16.9N 132.3E 17.0N 131.5E	PCN 6 PCN 6 PCN 6 PCN 5 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW PGTW PGTW
23 24 25 26	291806 292116 300047 300300	16.7N 131.7E 17.0N 131.5E 16.3N 130.8E 16.0N 130.2E	PCN 6 PCN 5 PCN 6	T2.5/2.5 /D1.0/24HRS		PGTW PGTW PGTW PGTW PGTU
* 28 29 30	300509 300509 300956 301200 301327	16.8N 129.8E 15.7N 129.9E 16.1N 129.3E 15.9N 129.1E	PCN 6 PCN 5 PCN 6 PCN 5	T2.5/2.5 /D1.0/24HRS	INIT OBS	RPMK PGTW PGTW PGTW
* 333 * 335 * 335 336 337 8	301600 301754 301755 302100 010000 010026	16.2N 128.7E 16.2N 128.7E 15.8N 128.6E 16.5N 129.0E	PCN 6 PCN 5 PCN 6 PCN 6		ULCC FIX ULCC FIX	PGTW RODN PGTW PGTW
39 40	010026 010208 010300 010458	16.5N 130.2E 15.9N 129.8E 16.4N 129.8E 17.0N 129.8E	PCN 4 PCN 5 PCN 4 PCN 4	T2.5/2.5 /D1.0/21HRS T3.5/3.5 /D1.0/24HRS	EXP LLCC Part Exp LLCC Exp LLCC	PGTW RPMK PGTW PGTW
41 42 43 44 * 45 46	01026 0102308 0102308 0104580 0104580 011304 011174 01122004 01122004 02014 02014 02004 02004 02004 02004 02004 02004 02004	17.5N 129.4E 18.6N 129.5E 18.5N 129.3E 18.5N 129.1E 18.6N 127.2E	PCN B PCN B PCN B PCN 6	T3.0/3.0 /D0.5/25HRS	EXP LLCC	PĞTÜ PĞTÜ PGTU PGTU RODN
47	012100 012214 020000 020147	17.8N 128.5E 18.1N 129.9E 17.8N 128.5E 18.0N 128.3E	PCN 6 PCN 5 PCN 6 PCN 5	T3.5/3.5	INIT OBS	PGTW RODN PGTW PGTW RPMK
489 591 553 555 555	020300 020447 020630 020900	15 19 14 19 15 15 15 16 16 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	######################################	T3.5/3.5 /D1.0/24HRS T4.0/4.0+/D0.5/24HRS		EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
55 56 57	021054 021105 021200	18.4N 127.2E 19.1N 127.3E 19.0N 127.0E	PCN 5 PCN 5 PCN 6			PGTW PGTW

* * * * * * * * * * * * * * * * * * *	2	99.00 199.00 111111111111111111111111111	26.6.25.15		T3 T4 T4 T3 T3 T3	3.5/3.5 /D0 5.0/5.0 /D1 1.5/4.5 /D0 5.0/5.0 /D1 1.5/4.5 /D1 1.5/4.5 /D0 1.5/4.5	.5/2	PHRS PHRS 9HRS 4HRS 4HRS		PART EXP	LLCC LLCC 9N 126.18	.1N 125.4E YE YE YE YE		CECEEEZEWEEZEWEEZEWEEZEWEZEWEZEWEZEWEZEW
Etv	TIME	ETV	E1 7	740MF	OBE	AIRCE			-UND 222	U	EVE A	DIEN	TEMP :-	
NO.	(Z)	POSITION		700MB HGT		MAX-SFC-WND VEL/BRG/RNG	MAX- DIR/				EYE O DIAM/T	RIEN- EYE ATION OUT/ I		S) MSN ST NO.
1234567890111111111122	239006255720 939006255720 939006255720 9100625573 9100625757 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 9100627574279 910062774747747747747747747747747747747747747	16 7N 131 48 111 111 111 111 111 111 111 111 111	- 700MK	9269775159 8239975159 8239993288 99999577777 78	1000 1000 1000 1000 1000 1000 1000 100	15 350 48 255 210 850 310 850 310 850 310 850 850 850 850 850 850 850 850 850 860 170 120 78 860 120 860 140 140 80 850 60 80 150 180 80 140 180 80 150 160 160 160 100 80 150 160	071400000000000000000000000000000000000	172120000000000000000000000000000000000	110 10 91 17 68 10 154 10 110 4 10 99 460 60 24 15	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	R 40	+265 +2626 +265 +2626 +266 +11 +265 +11 +11 +11 +11 +11 +11 +11 +11 +11 +11	5566552365653767874	26 55778888 100 11111111111111111111111111111
	ŢĬŴĔ	FIX POSITION			EYE	EYE	RADOB	-CODE				RADAR	₹	SITE
. 1274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789017456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901274567890127456789012745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745678901745078901750780750000000000000	(Z) 030500 030500 030500 031100 031100 031100 031100 031100 0311500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031500 031	20 11 11 11 11 11 11 11 11 11 11 11 11 11		GOOD GOOD GOOD FAIR POOR	SHAPE	70 70 90 50	4455 5519519519519519519519519519519519519519	73310 53418 73310 5//// 73412 53412 53416 53619	MOV 3648 MOV 3648 MOV 3648 MOV 3648					NO. 888888889898788978789898989898989898989

SYNOPTIC FIXES

FIX	TIME	FIX	INTENSITY	NEAREST	COMMENTS
NO.	(Z)	POSITION	ESTIMATE	DATA (NM)	
1234	050600	34.0N 128.1E	055	050	47168 47162 47800 47182 47805 47843
	050900	34.7N 128.9E	050	040	47168 47800 47805 47843 47182
	051200	35.3N 130.1E	045	050	47152 47138 47800 47755
	051500	36.3N 131.2E	040	075	47115 47138 47805 47755 47740

TYPHOON CECIL BEST TRACK DATA

1013062 12.2 116.5 55 12 1013122 12.6 115.9 60 12 1013182 13.0 115.3 65 13 1014002 13.4 114.8 75 13 1014002 13.4 114.8 75 13 1014062 14.4 113.7 85 14 1014102 14.4 113.7 85 14 1014102 15.5 109.3 100 16 1015122 15.5 109.3 100 17 1015002 15.5 109.3 100 17 1016002 17.0 106.7 90 17 1016002 17.0 106.7 90 17 1016062 17.0 105.4 50 17	POSIT WIND DST 18 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RORS UIND POST UIND 10 10 10 10 10 10 10 10 10 10 10 10 10	ERRORS: ST UIND POSIT 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ERRORS NI DST DS	2 20 238 -80
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ER AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPI AVERAGE SPEED OF TROPICAL	-2. 1. 16 13 CAL CYCLONE IS 10	STS 48-HR 72-HR 179. 196. 159. 139. 37. 45. -2745. 34. NM 10. KNOTS	TYPHOONS WHILE OVE WRNG 24-HR 48-H 14. 97. 184. 11. 85. 163. 2. 9. 36. 16. 12. 8		

TYPHOON CECIL FIX POSITIONS FOR CYCLONE NO. 20

FIX NO.	TIME	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3	000000000700704080090070000900870000000000	######################################	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS ULCC FIX ULCC FIX INIT OBS INIT OBS INIT OBS ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX SMALL EYE EYE FIX SMALL EYE EYE FIX RAGGED EYE ULCC FIX RAGGED EYE ULCC FIX SMALL EYE EYE FIX	PGTW PGTW PGTW PGTW
5 6 7	101200 101600 101800	8.1N 131.7E 8.6N 130.2E 8.6N 129.7E	PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW PGTW
8 9 10	111600 111800 120147	9.5N 121.4E 9.6N 121.1E 10.7N 119.8E	PCN 6 PCN 6 PCN 6	T2.0/2.0 /D0.5/24HRS T1.5/1.5	INIT OBS	PGTW PGTW PGTW
1123456789 1123456789	120400 120600 120617 120900	10.6N 120.9E 10.9N 120.4E 11.2N 120.0E 10.4N 119.2E	PCN 6 PCN 5 PCN 6	T1.5/1.5	INIT OBS ULCC FIX	PGTW RODN PGTW
15 16 17	121044 121200 121428	11.2N 119.8E 10.6N 119.1E 11.0N 118.8E	PCN 6 PCN 6 PCN 6	#0 F (0 F (D0 F (0 H)DC	ULCC FIX	RPMK PGTW RPMK
19	121600 121800 121909	10.7N 118.6E 10.9N 118.2E 11.3N 117.9E	PCN 6 PCN 5 PCN 5	T2,5/2.5 /D0.5/24HR5	III.CC FTX	PGTW PGTW RODN PGTW
01234567 2222222	130000 130127 130400	12.0N 117.0E 12.1N 116.7E 12.0N 116.6E	PCN 4 PCN 3 PCN 4	T3.5/3.5 /D2.0/23HRS T3.5/3.5	INIT OBS	PĞTÜ RPMK PGTU
25 26 27 28	130600 130612 131200 131208	11.9N 116.5E 12.1N 116.7E 12.2N 115.7E 12.2N 116.0E	PCN 3 PCN 6 PCN 5	T3.0/3.0 /D1.5/25HRS	ULCC FIX	RODN PGTW RPMK
29 30 31	131600 131800 131858	12.5N 115.6E 12.7N 115.5E 13.6N 115.2E	PCN 6 PCN 6 PCN 5	T3.5/3.5 /D1.0/24HRS	ULCC FIX	PGTW PGTW RODN
32 33 34 35	132303 140000 140248 140300	13.8N 115.1E 13.3N 115.1E 13.9N 114.8E 13.7N 114.5E	PCN 4 PCN 1 PCN 2	T4.5/4.5 /D1.0/24HRS T4.5/4.5 /D1.0/25HRS	ULCC FIX Small Eye Small Eye	PGTW RPMK PGTW
35 36 37 38	140600 140612 140900	13.9N 114.1E 14.0N 114.4E 14.1N 113.7E	PCN 2 PCN 3 PCN 2		EYE EYE FIX SMALL EYE	PGTW RPMK PGTW
39 40 41 42	141146 141200 141528 141600	14.1N 113.6E 14.4N 113.4E 14.0N 113.4E 14.6N 113.0E	PCN 2 PCN 5 PCN 4	T4.5/4.5 /D1.0/24HRS	RAGGED ÊYE ULCC FIX	PGTW RPMK PGTW
42345 445 4678	141800 141848 142100	14.8N 112.8E 15.2N 112.6E 15.1N 112.4E	PCN 2 PCN 1 PCN 2	TE E E O (D) O (30)/00	SMALL EYE DEVLPNG EYE EYE FIX	PGTW Rodn PGTW
46 47 48 49	150000 150026 150227	15.3N 111.8E 15.4N 111.7E 15.3N 111.2E 15.5N 111.4E	PCN 2 PCN 1 PCN 1	T5.5/5.5 /D1.0/24HRS T5.5/5.5 T5.5/5.5 T5.5/5.5	EYE FIX INIT OBS SMALL EYE	PGTW RODN RPMK
5012345	150227 150300 150600	15.5N 110.9E 15.7N 111.1E 16.0N 110.7E	PCN 1 PCN 2 PCN 2		RAGGED EYE 30 NM EYE FIX EYE FIX	RODN PGTW PGTW PDMK
54 55 56	150733 150845 150900 151121	16.4N 109.2E 16.4N 110.1E 16.7N 109.5E	PCN 2 PCN 2		30 NM EYE EYE FIX EYE 30 NM	RPMK PGTW RODN
56 57 59	151200 151508 151600	16.6N 109.6E 16.7N 108.5E 16.7N 108.4E	PCN 2 PCN 1 PCN 2	T5.5/5.5 /D1.0/24HRS	EYE FIX 30 NM EYE EYE FIX	RODN PGTU RPMK PGTU PGTU PGTU RODN
61 62 63	152100 152220 160000	16.9N 107.4E 17.1N 106.9E 16.8N 106.6E	1011110011001011010110111011110111101111		WIW IAN	PGTW RODN RPMK
64 65 66	160000 160207 160207	17.1N 106.8E 16.8N 106.2E 17.0N 106.2E	PCN 4 PCN 4 PCN 3			PGTW RPMK Rodn

67 68 69 70	160300 160600 160722 161448	16.6N 104 17.2N 105	1.9E PCN 6				ULCC FIX			PGTW PGTW RODN RKSO
					AIRCR	RAFT FIXES				
FIX NO.	TIME (Z)	FIX POSITION	FLT 700M LVL HGT		FC-UND RG/RNG	MAX-FLT-LVL-UND DIR/VEL/BRG/RNG		EYE ORIEN- DIAM/TATION	EYE TEMP OUT/ IN/ DP	(C) MSN /SST NO.
12345678	110222 13000 130156 130824 132115 140044 140618 140851	9.4N 128.3E 11.8N 117.0E 12.0N 116.8E 12.4N 116.4E 13.3N 115.1E 13.4N 114.9E 13.9N 114.2E 14.0N 114.0E	700MB 2990 700MB 2987 700MB 2984 700MB 2886 700MB 2874 700MB 2821	975 45 31 974 75 11	30 50 40 120 20 95 50 15 50 18	070 30 360 19 060 52 310 45 130 38 060 60 230 39 140 60 140 64 090 10 210 67 150 18 160 62 950 18 180 90 110 30	5 10 CIRCULAR 10 5 5 5 ELLIPTICAL 8 5 CIRCULAR	26	+24 +24 +23 +12 +14 +10 +10 +13 +13 +11 +13 +13 +13 +15 +13 +15 +15 + 6 +11 +17 + 6	3 4 5 5
					RADAR	R FIXES				
FIX NO.	TIME (Z)	FIX POSITION	RADAR ACCRY	EYE 1		RADOB-CODE ASUAR TDDFF	COMMENTS		RADAR POSITION	SITE UMO NO.
1 23 4 5 6 7 8	150300 150400 150500 150600 150700 150900 151000	15.5N 110.9E 15.5N 110.8E 15.7N 110.7E 15.7N 110.7E 15.9N 110.4E 16.3N 109.8E 16.4N 109.8E 17.0N 105.0E	LAND LAND LAND LAND LAND LAND			108/2 //// 10785 53108 10772 53208 10772 53109 10782 5309/ 10772 53111 10862 53011			16.8N 112.3E 16.8N 112.3E 16.8N 112.3E 16.8N 112.3E 16.8N 112.3E 16.8N 112.3E 16.8N 112.3E 16.8N 112.3E	59981 59981 59981 59981 59981 59981 59981 48356

SUPER TYPHOON DOT BEST TRACK DATA

BEST TRA	ck w	JARNING ERRORS	24 HOU	R FORECAST	48 HOUR F		72 HOUR FORECAST ERRORS
MO / DA / HR	0.000000000000000000000000000000000000	UND	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.000000000000000000000000000000000000	355.05.5.05.5.06.5.06.00.00.00.00.00.00.00.00.00.00.00.00.	-0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	
AVG FORECAST POSIT AVG RIGHT ANGLE ERF AVG INTENSITY MAGNI AVG INTENSITY BIAS NUMBER OF FORECASTS	ERROR ROR ITUDE ERROR	10. 63. 8 8. 32. 3 4. 15. 2 2. 5. 3	-HR 72-HR 0. 131. 1. 68. 6. 29. 4. 8. 5 21	17990 1879 10. 8. 4. 2. 33	ONS WHILE OVER 24-HR 48-HR 63. 80 32. 31. 15. 26. 5. 4. 29 25	35 KTS 72-HR 131. 68. 29. 8.	
DISTANCE TRAVELED I	BY INOPICAL CYCL	LONE IS 3074.	ITEI				

AVERAGE SPEED OF TROPICAL CYCLONE IS 13. KNOTS

SUPER TYPHOON DOT FIX POSITIONS FOR CYCLONE NO. 21

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS INIT OBS INIT OBS INIT OBS ULCC FIX UCC	SITE
1	111200 111600 111800 120006	5.5N 155.9E 6.7N 155.5E	PCN 6 PCN 6 PCN 6	T1.0/1.0	INIT OBS	PGTU PGTU PCTU
3 4 5 6 7	120006 120400 120600	8.7N 153.8E 8.5N 153.0E 8.6N 153.0E	PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW PGTW
7 8 9	120900 121200 121246	8.8N 152.8E 9.0N 151.5E 8.5N 151.2E	00000000000000000000000000000000000000	T4 E /4 E /D0 E /20UDC	ULCC FIX ULCC FIX	PGTW PGTW PGTW
10 11 * 12 13	121800 121800 122100 130000	9.4N 150.6E 9.7N 150.6E 10.5N 148.8E	PCN 6 PCN 6 PCN 6	T2.5/2.5 /D1.0/24HRS	ULCC FIX ULCC FIX	PGTW PGTW PGTW
14 15 16	130400 130431 130600	11.4N 147.5E 11.1N 147.7E 10.9N 146.3E	PCN 6 PCN 6 PCN 6 PCN 6		ULCC FIX ULCC FIX ULCC FIX	PGTW RODN PGTW
456789010745678901074567890 11111120000000000000000000000000	131027 131200 131600	11.1N 145.2E 11.3N 145.1E 11.4N 143.6E	PCN 4 PCN 6 PCN 6 PCN 5	T2.0/2.0+/D0.5/24HRS	ULCC FIX ULCC FIX	RODN PGTW PGTW
21 22 23	131716 131800 132307	11.9N 143.4E 11.5N 143.4E 11.8N 142.5E	PCN 5 PCN 6 PCN 4 PCN 4	T3.5/3.5	ULCC FIX INIT OBS	RPMK PGTW RODN PGTW
25 26 27	140300 140600 140600	11.8N 141.5E 11.7N 140.8E 11.9N 140.7E	PCN 4 PCN 4 PCN 4	13.3/3.57/01,0/64003	PSBL IR EYE	PĞTÜ PĞTÜ PĞTÜ
39 29 88	141200 141600 141705	12.0N 140.6E 12.5N 139.7E 12.6N 138.9E	PCN 4 PCN 6 PCN 4	T4.0/4.0+/D2.0/24HRS		PGTW PGTW RODN
31 32 33 34	142100 142100 142100 142245	13.1N 139.0E 13.1N 138.5E 13.2N 138.1E 13.1N 138.1E	PCN 4 PCN 6 PCN 2 PCN 1 PCN 1	T4.5/4.5+/D1.0/25HRS	RAGGED EYE EYE 30 NM DIA RAGGED EYE EYE FIX	PGTU RODN RODN
35 36 37	150000 150046 150300	13.2N 138.0E 13.1N 137.5E 13.2N 137.2E	PCN 2 PCN 2 PCN 2	T5.0/5.0 /D1.5/24HRS T4.5/4.5	RAGGED EYE INIT OBS 12 NM DIA RAGGED EY EYE FIX	PGTW RPMK PGTW
38 39 40 41	150551 150600 150900 150940	13.4N 136.4E 13.3N 136.7E 13.7N 136.2E 13.6N 136.1E	PCN 2 PCN 2 PCN 2		EYE .3 DEG EYE FIX WELL DEFINED EYE EYE 30 NM DIA	PGTW PGTW RPMK
41 42 43 44 45 46 47	10000060000000000000000000000000000000	9BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB		T6.5/6.5 /D2.5/24HRS	WELL DEFINED EYE WELL DEFINED EYE EYE FIX	PGTW PGTW RODN PCTU
46 47 48	152039 152100 152223	13.6N 134.9E 13.6N 133.9E 13.8N 134.5E 13.9N 133.9E	PCN 2 PCN 2 PCN 2	T5.5/5.5 /D1.0/23HRS	EYE FIX EYE FIX UELL DEFINED 20 NM DIA EYE	RPMK PGTU RPMK
49	152223 160000	14.0N 133.9E	PCN Z	T7.5/7.5-/D2.5/24HRS		PGTW

50 160026 14 2N 1333.4EEE 51 1600300 14 3N 1332.6EE 52 1600500 14 3N 1332.6EE 53 1600500 14 6N 1331.6EE 54 1600500 14 6N 1331.6EE 55 1600500 14 6N 1331.6EE 55 1600500 14 6N 1331.6EE 55 160100 14 6N 1331.6EE 56 16100 14 6N 1331.7 39 58 161600 14 6N 1331.7 39 58 161600 14 6N 1331.7 39 58 161600 14 7N 1309.7 EE 60 161800 14 7N 1209.7 EE 60 161800 14 7N 1209.7 EE 60 170107 14 8N 1209.7 EE 60 170107 14 5N 1200.7 EE 60 170107 14 5N 1200	PCN 1 PCN 2 PCN 1 PCN 1 PCN 1 PCN 1 PCN 1 PCN 1 PCN 2 PCN 1 PCN 2 PCN 1 PCN 2 PCN 1 PCN 2 PCN 4 PCN 6 PCN 7	WELL DEFINED EYE RODN. EYE FIX PGTW EYE FIX PGTW ILL DEFINED EYE PGTW RAGGED EYE PGTW EYE OPN SE RODN EYE FIX RPMK FILL DEFINED EYE PGTW EYE FIX RPMK PGTW PGTW PGTW PGTW PGTW PGTW PGTW PGTW
101 191137 15. 9N 118. 3E 103 191137 16. 1N 117. 3E 103 191137 16. 1N 117. 3E 103 191137 16. 6N 116. 3E 103 191200 16. 1N 117. 3E 105 191600 16. 1N 116. 3E 105 191600 16. 5N 116. 6E 108 191800 16. 5N 116. 6E 108 192305 16. 6N 115. 3E 1108 192352 17. 4N 115. 3E 1109 192352 17. 4N 115. 3E 110 200002 17. 4N 115. 5E 112 200000 17. 3N 115. 1E 113 200237 17. 3N 115. 1E 114. 200000 17. 3N 114. 1E 115 200600 17. 3N 114. 1E 116 200600 17. 3N 111. 3E 117. 3N 112. 3E 119. 3D 1108. 3E 119. 3D 119. 3D 119. 3E 119. 3D 119. 3E 119. 3D	PCN 6 PCN 7 PCN 8 PCN 9 PCN 6 PCN 7	RAGGED 20NM EYE RODN RODN PGTW PGTW PGTW PGTW PGTW PGTW PGTW PGTW
FIX TIME FIX FLT NO. (2) POSITION LVL	AIRCRAFT FIXES 700MB OBS MAX-SFC-UND MAX-FLT-LVL-UND ACCRY HGT MSLP VEL/BRG/RNG DIR/VEL/BRG/RNG NAV/ME	EYE EYE ORIEN- EYE TEMP (C) MSN T SHAPE DIAM/TATION OUT/ IN/ DP/SST NO.
1 132204 11.5N 142.7E 1500FT 2 140027 11.5N 142.2E 1500FT 3 140027 11.5N 141.3E 700MB 4 141.3E 700MB 5 142130 13.0N 138.4E 700MB 6 150022 13.1N 137.8E 700MB 7 150615 13.5N 136.7E 700MB 8 15025 13.5N 136.7E 700MB 10 152302 14.0N 134.4E 700MB 10 152302 14.0N 134.4E 700MB 11 160029 14.0N 134.6E 700MB 11 160029 14.0N 134.6E 700MB 11 160029 14.0N 131.5E 700MB 11 1702965 14.4N 126.7E 700MB 14 170996 14.4N 126.7E 700MB 15 171208 14.4N 126.7E 700MB 16 172116 14.4N 124.8E 700MB 16 172156 14.4N 124.8E 700MB 17 172359 14.4N 124.3E 700MB 18 180534 14.7N 123.5E 700MB 18 180528 14.8N 123.2E 700MB	992 50 670 25 070 67 070 25 10 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	CONCENTRIC 10 30 +111 +16 + 9 4 CIRCULAR 25 +13 +16 +13 5 CIRCULAR 25 +19 +17 +11 7 CIRCULAR 26 + 9 +17 +11 7 CIRCULAR 15 +14 +30 +11 8 CIRCULAR 15 +14 +30 +11 8 CIRCULAR 18 +13 +30 +8 8 CONCENTRIC 25 15 +13 +28 +10 10 CONCENTRIC 15 25 +11 +27 +5 10 CIRCULAR 10 +12 +22 +6 11

	191152 192111 192335	16.2N 117.6E	700MB 700MB 700MB 700MB 700MB	2831	979 970 962	50 340 70 120 75 040	50 95 21	160 140 180	61 340 64 080 76 050 79 160 66 110	77 80 44	10	232	ELLIPTICAL 15 5	28 0 360	+12 +14 +11 +12 +15 +13 +13 +15 +12 +11 +16 +11 +14 +14 + 9
27	E00031	11.31 113.76	TOOMS	6/55	962	75 040	21	190	66 110	60	5	5	ELLIPTICAL 15 10 :	160	+14 +14 + 9

RADAR FIXES

	Z)	RADAR	ACCRY		DIAM	RADOB-CODE ASWAR TODEF	COMMENTS	RADAR POSITION	SITE WMO NO.
1			POOR FAIR POOR POOR FAIR FAIR	OR IR IR OR		10623 \$2510 10623 \$2510 10613 \$25213 10613 \$25213 10612 \$25210 10612 \$25210 10612 \$25210 10612 \$25210 10612 \$25210 10612 \$25210 10612 \$25210 10612 \$2700 10612 \$2710 10612 \$2710 10612 \$2710 10612 \$2710 10612 \$2710 10612 \$2910 10612 \$2910 10613 \$2910	COMMENTS EYE CIRCULAR OPN 50 PRCNT EYE 100 PRCNT CIR EYEWL SE GOOD EYE 100 PRCNT CIR EYEWL SE GOOD	POSTT TON 14.0N 124.3E 14.1N 123.0E	777770

TROPICAL STORM ELLIS BEST TRACK DATA

1014062	POSIT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	UIND POSIT UIND DST 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	RORS UIND POSIT UINT DST WIND WIND	
1019182 6.3 146.3 35	6.2 147.2 45. 12. 6.3 146.4 45. 6. 6.3 145.2 35. 8.	5. 0.0 0.0 00. 10. 0.0 0.0 00. 5. 0.0 0.0 00.	0. 0.0 0.0 00. 0. 0. 0.0 0.0 00. 0. 0. 0.0 0.0 00. 0.	0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE E AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROP AVERAGE SPEED OF TROPICAL	6. 23. 17 13 ICAL CYCLONE IS 104	5TS 48-HR 72-HR 363. 583. 311. 438. 41. 59. 41. 59.	TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 43-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	v.v v.v ve. v.

TROPICAL STORM ELLIS FIX POSITIONS FOR CYCLONE NO. 22

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2	150000 150300	8.2N 155.4E 8.5N 155.1F	666666664744 XXXXXXXXXXXXX CCCCCCXXXXXXXX PPPPPPPPPP	T1.0/1.0	INIT OBS	PGTW
* 3	151200 151600	8.2N 155.4E 8.5N 155.1E 7.7N 152.8E 8.7N 153.7E	PCN 6 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW
* 5 6 7	151800 152039	8.1N 153.3E 8.8N 153.3E	PCN 6	T2.0/2.0	INIT OBS	PGTW RPMK
, 9	152223	8.7N 154.2E 9.9N 152.9E	PCN 6 PCN 4	T1.5/1.5 T2.5/2.5 /D1.5/24HRS T3.0/3.0	INIT OBS EXP LLCC	RPMK PGTW
10 11	160026	10.2N 152.9E	PCN 3 PCN 4	T3.0/3.0	INIT OBS EXP LLCC EXP LLCC	RODN PGTW
112 123 14 15 * 16	160900	10.8N 152.1E 10.8N 151.8E 11.0N 151.6E	PCN 6		INIT OBS EXP LLCC INIT OBS EXP LLCC EXP LLCC EXP LLCC	PGTU PGTU PGTU
* 16	161600 161644	11.1N 150.9E 11.6N 150.8E	PCN 6 PCN 4	T2.5/2.5-/D1.0/24HRS	EXP LLCC	PGTW RODN
18 19	162100	11.3N 150.9E 11.0N 150.8E	PCN 6	72.5/2.5 /W1.0/26HRS		PGTW PGTW
20 21	170000 170300	10.3N 150.4E 10.7N 150.7E	PCN 6 PCN 4	T3.0/3.0+/D0.5/24HRS	PART EXP LLCC	PGTW PGTW
23 23	170600 170857	10.5N 150.6E 10.8N 151.5E	PCN 6 PCN 5			PGTW RPMK
25 26	171200 171600	10.8N 150.4E 10.2N 150.0E	PCN 6 PCN 6	T3.0/3.0+/D0.5/24HRS		PGTW PGTW
27 28	171800 171956	10.3N 149.9E 10.0N 150.7E	PCN 6 PCN 6		ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW
30 31	180000 180300	9.4N 150.8E 9.3N 149.5E	PCN 6 PCN 6	T3.5/3.5 /D0.5/24HRS	ULCC FIX	PGTW PGTW
290-1234567290-1234567290 111222222222222222222222222222222223222222	000000990706000000400100007000006000990655200050805205100050000001111515100050000060000990655200050805205200050000500005000050000	9.3N 149.3E 9.5N 149.5E	######################################			PGTW PGTW
35 36	181225	8.5N 149.6E 8.4N 149.6E	PCN 6 PCN 5			RODN PGTW
37 38	181622 181800	8.1N 148.9E 7.8N 148.6E	PCN 5 PCN 6	T3.5/3.5 /D0.5/24HRS	W 00 FTV	PĠTŴ PĠTW
40 41	182325	7.4N 148.4E 7.4N 148.5E 7.7N 148.3E	PCN 6 PCN 6	T3.5/3.5 /S0.0/24HRS	ULCC FIX	PGTW PGTW PGTW
41 42 43 44 45 46 47	190508 190600	6.9N 148.1E 6.8N 148.0E	PCN 6			PĞTÜ PĞTÜ
45 46	190815	7.3N 147.6E 7.0N 147.5E 7.0N 147.3E	PCN 5 PCN 5			PGTW PGTW PGTU
47 48	191611 191800	7.4N 146.6E 6.9N 146.5E	PCN 6 PCN 6	T3.5/3.5 /S0.0/24HRS		PGTW PGTW
49 50 51	192030	6.7N 146.7E 6.8N 146.4E 6.2N 145.2E	PCN 6 PCN 6 PCN 6			PGTW PGTW PGTW
* 52 * 53	200300 200457 200600	7.0N 145.9E 7.6N 145.9E	PCN 6	T2.5/3.0+/U1.0/24HRS		PGTW PGTW
48 49 51 52 53 54 55 56	200600 200908 201200 202034	######################################	10000000000000000000000000000000000000		ULCC FIX	
57 58	202034	9.7N 140.8E 10.4N 139.5E	PCN 6 PCN 6		ULCC FIX ULCC FIX INIT OBS	PGTW PGTW
59 60	210025	10.4N 139.2E 9.7N 139.6E	PCN 5 PCN 5 PCN 6	T2.5/2.5	ULCC FIX	PGTW
61	210300	10.2N 128.9E	PUN 6	T2.5/2.5 /50.0/24HRS	ULCC FIX	PGTW

63 64	3 2109	00 11.5N 1	38.4E 38.2E 35.2E		6 6						L	ALCC FIX ALCC FIX BLCC FIX				PC	GTW GTW GTW
						£	IRCR	RAFT F	IXES								
FIX NO.	TIME (Z)	FIX POSITION	FLT LVL	700ME HGT	OBS MSLP	MAX-SFC- VEL/BRG/	UND RNG	MAX- DIR/	FLT-LVL VEL/BRG	-WND -RNG	ACCRY NAV/MET	ÉYE SHAPE	EYE C	RIEN-	EYE TEMP (COUT/ IN/ DP/S	;) iST	MSN NO.
120456789011234	16045325 1702550 17022345 1722345 1722345 181159 1823226 1823226 192330 192330 192330 192330	10.7N 150.1E 10.7N 150.5E 9.4N 150.8E 8.3N 140.8E 8.3N 140.8E 7.4N 148.3E 6.5N 147.5E 6.4N 147.5E 6.2N 145.5E 8.9N 138.8E	1500FT 1500FT 1500FT 700MB 700MB 1500FT 1500FT 1500FT 1500FT 1500FT 1500FT	3075 3071 3081 3119 3153	1000 9997 9997 999 1000 9997 9998 1008 1007	45 040 40 220 45 170 65 360 60 240 45 350 30 060 45 340 35 010 15 060	195000 4000 9650	170 3070 170 170 150 150 140 140 170	970 970 922 970 970 970 970 970 970 970 970 970 970	000000610040080 51174051732913	05011108700045000	CIRCULAR CIRCULAR ELLIPTICAL	20 15 60 40	010	+25 +27 +23 +26 +27 +23 +11 +14 + 4 + 9 +115 + 16 +26 +27 +24 +25 +27 +24 +24 +27 +25 +11 +13 + 9 +10 +10 + 6	25 25 25 25 25 25 25 25 25 25 25 25 25 2	1335577889991114
						SYN	OPTI	C FIX	ES								
FIX NO.	TIME (Z)	FIX POSITION	INTENSI ESTIMAT	TY NE E DA	AREST TA (NM	D		c	OMMENTS								

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

1 14000 6.5N 159.0E 010 060 91353 91348 2 141200 6.9N 157.0E 010 070 91348 91338 91353 91334 3 150000 7.9N 154.8E 020 170 91338 91334 91348 91353 91426 UYDO JJQL



BEST TRACK	WARNING ERRORS	24 HOUR FORECAST	48 HOUR FORECE	
MOV PA	UIND DET UITE	116 7 50 185 10 111 115 10 115 10 115 10 115 115 11	D POSIT 28 2644 2614 2615 2625 2625 2625 2625 2625 2625 2625	RORS UIND 0 15 1 115 1 5 1 5 5 316 1 15 1 5 1 5 1 15 1 5 5 1 3 16 1 5 1 15 1 5 1 5 1 15 1 5 1 5 1 15 1 5 1 5 1 15 1 5 1 5 1 15 1 5 1 5 1 15 1 5 1 5 1 15 1 5 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15 1 15
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	15. 104. 242. 4 7. 58. 136. 2 2. 13. 20. -047. +	72-HR URNG 114. 12. 331. 7. 27. 2. 130. 26 34	HOONS WHILE OVER 35 KT 24-HR 48-HR 72-H 106. 242. 414. 57. 136. 231. 13. 20. 27. -5713. 32. 30. 26.	S R

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 1849. NM
AVERAGE SPEED OF TROPICAL CYCLONE IS 8. KNOTS

TYPHOON FAYE FIX POSITIONS FOR CYCLONE NO. 23

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORÁK CODE	COMMENTS	SITE
123456789	221332 230000 230120 230300 230607 230900 231012 231200	13.1N 125.4E 13.4N 125.4E 13.1N 125.4E 13.1N 124.9E 13.6N 125.2E 14.1N 124.1E 13.9N 124.1E 14.6N 124.1E	2222222 22222222 200000000000000000000	T1.5/1.5	INIT OBS	PGTW PGTW PGTW PGTW PGTW PGTW PGTW PGTW
9 10 11 13 14 15 17	23090100 23090100 23091124600 231121115 231121115 231121115 231121115 2400067 24001007	######################################	344765671 CCCCCCCCCCC	T2.5/2.5 T2.5/2.5-/D1.0/26HRS	INIT OBS	######################################
18 19	240107 240300 2403556 2405556 2405551 241200 241346 241600	15.1N 121.7E 15.6N 121.6E 15.8N 121.4E 15.6N 121.4E 16.3N 121.4E 16.3N 120.9E 17.1N 120.4E 17.5N 120.2E	6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	T2.0/2.0 T1.0/2.0+/W1.5/24HRS	INIT OBS ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW RODN RPMW PGTW PGTW PGTW PGTW
01127456785012745678 2222222222222223333333333333333333333	241840 241840 242231 242231 242331 242331 250227	17.5N 119.9E 18.4N 120.1E 17.7N 119.9E 18.6N 118.8E 18.2N 119.5E 18.5N 118.8E	PCN 6 PCN 6 PCN 3 PCN 5 PCN 4	T1.0/1.0 T2.5/2.5 /D0.5/22HRS	ULCC FIX ULCC FIX INIT OBS PART EXP LLCC	PGTW PGTW RPMK RODN RPMK PGTW RODN
334 334 336 338 338	231110070553 4423300200455 444230023045 4500235505 5505011110 2011110 2011110 2011110 2011110	17.7N 118.5E 17.7N 118.8E 17.7N 118.7E 18.4N 118.6E 18.4N 119.8E 18.3N 119.9E		T2.5/2.5 /D0.5/22HRS T2.5/2.5 /S0.0/27HRS T2.5/2.5	ULCC FIX INIT OBS PART EXP LLCC PART EXP LLCC PART EXP LLCC INIT OBS EXP LLCC ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX	RODN PGTW PGTW RKSO PGTW RPMK RODN RODN
39 * 40 * 41 43 * 44 * 45	251111 251507 251600 251831 2522100 2522100 2522307 260000	19.4N 120.1E 18.2N 119.8E 18.1N 119.5E 18.5N 119.6E 18.5N 120.6E	, PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP	T3.0/3.0-/D2.0/24HRS	ULCC FIX	PGTW PGTW PGTW PGTW RKSO PGTW
* 46 47 48 49	260206 260300 260534 260534	18.5N 120.4E 18.1N 120.2E 18.2N 121.1E	965655 9657777 96677777	T2.5/2.5 /S0.0/24HRS T3.0/3.0 /D0.5/24HRS T2.5/2.5 /S0.0/24HRS	EXP LLCC	RÖDN PGTW PGTW RKSO

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107 300045 22.8N 125.0E 108 300300 23.3N 126.2E 109 300451 23.3N 126.3E 110 300600 23.6N 126.6E 111 300633 23.5N 126.4E	PCN 2 PCN 2 PCN 1 PCN 1 PCN 4 PCN 4 PCN 4 PCN 4 PCN 4 PCN 3 T3.5/4.0 /W0.5/25HRS	RAGGED EYE RAGGED EYE EYE FIX RAGGED EYE	RODK RPGTTUU PGGTTUU PGGTT PPMK
113 301008 23.5N 127.0E 114 301008 23.5N 127.0E 115 301106 23.5N 127.6E 116 301200 24.1N 127.7E 117 301326 24.2N 127.6E 118 301600 24.2N 127.6E 119 301800 24.7N 128.1E	PCN 6 PCN 5 PCN 5 PCN 4 PCN 6 PCN 4 PCN 6 T5.0/5.0-/D0.5/24HRS PCN 6	ULCC FIX ULCC FIX PSBL EYE ULCC FIX ULCC FIX ULCC FIX	PGGDK PGGDK RRPGGT PGGT PGGT
124 310000 25.1N 129.4E 125 310025 25.2N 129.4E 126 310300 25.4N 130.1E	PCN 5 PCN 6 PCN 5 T5.0/5.0-/D0.5/23HRS PCN 5 PCN 6 T4.0/5.0 /W1.0/24HRS PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	EXP LLCC	RKSOW PGGTW PGGTW PGGTW PGGTW PGTW
128 310600 25.6N 130.7E 129 310900 25.5N 130.9E *130 311044 27.0N 133.6E 131 311200 26.3N 132.4E 132 311305 26.1N 133.1E 133 311600 26.5N 133.2E 134 311726 26.7N 133.1E	PCN 6 PCN 4 PCN 6 PCN 6 PCN 6 T3.5/4.0 /W1.5/24HRS PCN 6	EXP LLCC EXP LLCC	PĞTÜ PGTW RPMW PGTW PGTW RODTW RODTW PGTW
136 312100 27.1N 134.7E 137 312143 27.7N 135.3E 138 312222 27.1N 135.3E 139 01002 27.5N 136.3E 140 010300 27.5N 136.9E 141 010429 27.6N 137.6E 142 010600 27.7N 137.6E 143 010919 28.0N 139.9E 144 011245 28.3N 141.4E	PCN 6 PCN 5 PCN 5 PCN 3 PCN 4 PCN 4 PCN 4 PCN 6 PCN 6	EXP LLCC EXP LLCC EXP LLCC EXP LLCC EXP LLCC	RKSO PGTW PGTW PGTW PGTW PGTW PGTW PGTW
	ATRORAFT FIXES		
FIX TIME FIX FLT NO. (Z) POSITION LVL	700MB OBS MAX-SEC-UND MAX-FLT-LVL-UND ACCRY HGT MSLP VEL/BRG/RNG DIR/VEL/BRG/RNG NAV/ME	T SHAPE DIAM/TATION OUT/ IN/ DP:	(C) MSN /SST NO.
1 230100 12 9N 125.8E 1500FT 20133 14 9N 125.8E 2700MB 2 232133 14 9N 125.21E 700MB 2 240044 15 2N 125.1E 700MB 5 242339 18 3N 113.1E 700MB 6 250605 17 9! 116.7E 1500FT 7 250904 18 9N 125.2E 7000FB 8 25255 18 1N 119.8E 7000FB 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 19 10 250605 1	1004 35 090 10 140 27 070 60 6 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	+11 +13 + 8 +12 +14 + 8 +24 +24 + + +23 +25 + +27 +25 +25 +24 +25 +23 +24 +25 +23 +23 +25 +24	28 27 27 27 27

6789010345678901 11100000000000000000000000000000000	279137146771601 2021021371467550 2021021021605130 20210200605130 202100000000000000000000000000000000	19,51 123,14 20,50 123,96 20,50 123,96 20,50 123,96 21,50 123,96 21,50 123,96 21,50 123,96 21,50 125,76 22,70 125,76 22,70 125,76 23,70 125,76 23,70 126,96 25,20 129,16 25,20 129,16 26,00 130,66 26,00 130,66 26,00 130,66 26,00 130,79 26,00 137,96	700ME 700ME 700ME 700ME 700ME 700ME 700ME 700ME 700ME 700ME 1500FT 1500FT 1500FT	2937 28857 28577 28577 2841 2968 3108	9859729669766999410004	40 000 000 000 000 000 000 000 000 000	60000370605550005 1 2 21 1210131	29600000 10000000000000000000000000000000	7025660000000000000000000000000000000000	3955773834703455 3 3111 1 22 92231	11010011110011100		CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR CIRCULAR	000 0000000 00000000		+10 + 9 + 13 +10 +10 +10 +11	+20	++++++++++++++++++++++++++++++++++++++	25564 2564	11 12 12 13 14 15 16 17 17 19
FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE		RADOB	S-CODE			,	OMMENTS			RA	DAR.		SITE	٤
1	231600		LAND	ACORT	SHALE				4/// 53403 53012			Ü	OMMENTS						983	21
0745678901074567890107456789010878901087890109	231800 231800 231830 231900	44.4 37.11.19.28.21.20.20.20.20.20.20.20.20.20.20.20.20.20.	LAND LAND LAND	FAIR				1107/0/// 127/0/// 127/0//// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12/// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12// 127/12	1756 5327118 532727118 532727118 532727118 5327117 5327117 532717 532717 532717 532717 532717 532717	E PERE BERE E E E E E E E E E E E E E E E E	9 CUCCEONNO P CUCCEONNO P OP T P P P OP OF T P P OP OP N P P OP OP N P P OP OP N P P	T TLI TLI TLI TLI TLI TLI TLI TLI TLI TLI	CIR OPN SE CIR OPN SE P DIA 44/20 CIR OPN NE CIR OPN NE CIR GOOD			77.77.77.77.77.77.77.77.77.77.77.77.77.			######################################	
394567890-1294567890-12945 39999994444444555555	10160000000000000000000000000000000000	18. 59 120 72 22 22 24 25 22 24 25 25 26 22 24 25 26 26 26 26 26 26 26 26 26 26 26 26 26		FAÎR				265/91/4223324 625/91/422334 6219/1/424334 6219/1/444334 6219/1/444334 6219/1/444334 6219/1/444334 6219/1/444334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/44334 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/443 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6219/1/4434 6	50206 70307 50000 70107 50514 72008 70509								1225454545454545454545454545454545454545	20000000000000000000000000000000000000	47991 47991 47991 47991 47991 47991 47991 47991 47992 47992 47992 47992 47992	188878787878787878788
56 57 58 59	291800 291900 291900 291900	22.2N 125.4E 22.3N 125.7E 22.3N 125.5E 22.3N 125.5E	LAND LAND LAND LAND	POOR POOR		5 5	0	3//13	50111 50311 70510 70610	MOV	0420 0420				,	24.8N 24.8N 24.8N 24.3N 24.3N 24.3N	125 125 125	. 3E . 3E . 3E	4792 4792 4792 4792	27 27 27
60 61 62 63	292000 292000 292000 292100	22.4N 125.7E 22.4N 125.7E 22.4N 125.7E 22.4N 125.7E 22.6N 125.8E	LAND LAND LAND	POOR POOR		5	0	21814	50611	MOV	3610 0120					24.3N 24.3N 24.8N 24.8N	124 125 125	. 3E . 3E	4791 4791 4792 4792	18 27 27
64 65 66 67	292100 292100 292200 292200	22.5N 125.7E 22.5N 125.8E 22.5N 125.8E 22.5N 125.8E	LAND LAND LAND			_		21913 20823 21813	50108 70407 70407 50510	1101	0120					24.81 24.81 24.81 24.31 24.31 24.31	125	. 3E . 3E	4792 4792 4791 4791	27 18 18
68	292200 292300 292300 292300	28.6N 125.8E 28.7N 125.9E 28.7N 125.9E 28.7N 125.9E 28.7N 125.9E 28.7N 126.0E	LAND LAND LAND LAND	POOR		5 5	9			MOV	0910 0515					24.8N 24.8N 24.8N	125	. 3E . 3E	4792 4792 4792 4792	27 27 27
69012345678901234 777777788888888	300000	22.7H 125.9E 22.8H 126.0E 22.8H 126.0E	LAND LAND LAND LAND	POOR GOOD		5	ĕ		50108 70307 70407 50308	MOV	0320					24.3N 24.8N 24.8N	124 125 125	. 3E . 3E	4791 4791 4792 4793	18 27 27
76 77 78 79	300100 300100 300200 300200	20.9N 126.1E 20.8N 126.1E 20.9N 126.1E 20.9N 126.1E	LAND LAND LAND LAND	300.,		ь	•	11914 21813 22913	50311 70306 70306 50608	1154	73CV					24.8N 24.8N 24.3N 24.3N	125	. 3E . 3E	4798 4798 4791 4791	27 18
80 81 82	300200 300200 300300 300300 300300	23.0N 126.1E- 23.2N 126.3E 23.1N 126.1E	LAND LAND LAND	GOOD		5	v		70511		0350					24.8N 24.8N 26.2N 24.3N	125 127 124	. 3E . 3E . 3E	4793 4793 4793 4793	18
85 86 87 88 89	300300 300300 300400 300400 300500 300500	1 26 6 6 6 6 6 6 6 6	LAND LAND LAND LAND LAND LAND LAND	POOR		5	0	25/43 22912 6///1 22913 6///1 11913	50412 70409 50408 50108 60506 50708 70509	MOV	0315					\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	125 125 124 127 125 127 125	.3E .3E .3E .3E .3E	4798 4798 4798 4798 4798 4798	27 18 27 27 27
91 92 93	300500 300600 300700	23.3N 126.5E 23.4N 126.7E 23.5N 126.8E	LAND LAND LAND	GOOD		5	ě		70608	MOV	0350 0350					24.8N 24.8N 24.8N 26.2N	125	. 3E . 3E . 8E	4791 4792 4792 4793	27
90 91 93 94 95 96 97 99	300700 300700 300700 300700 300800 300800	23.5N 126.8E 23.5N 126.8E 23.5N 127.0E 23.5N 127.0E	LAND LAND LAND LAND LAND	POOR POOR		5	0 a	22913 55/43 6///1	70611 50711 70710		9629					24.8N 24.3N 24.8N 26.2N 24.8N	125 124 125 127 125	. 3E . 3E . 3E	4792 4791 4792 4793 4793	27 18 27 37
100 101 102 103	300800 300800 300900 300900 300900 300900	23.4N 127.0E 23.6N 127.1E 23.7N 127.0E	LAND LAND LAND LAND	B005				55//3 22812 55//1 3//72	50714 70611 70711 53611							24 . 8N 24 . 3N 26 . 2N 24 . 8N	125 124 127 125	.3E .2E .8E .3E	4792 4791 4793	27 18 17
103 104 105 106 107 108	300900 300900 301000 301000	23.7N 127.2E 23.5N 127.1E 23.7N 127.2E 23.7N 127.4F	LAND LAND LAND LAND	POOR		5			70608 70610 70612	MOV	9326					24.8N 24.3N 26.2N	125	. 3Ē . 3Ē . 3Ē	4798 4798 4791 4793	18 37
103	301000 301000 301100	23.7N 127.3E 23.8N 127.3E 23.9N 127.4E	LAND LAND LAND	POOR POOR		5: 5:	ย 0	6///2	50616		0710 0520					24.8N 24.8N 24.8N 24.8N	125	. 3E . 3E . 3F	4793 4793 4793	27 27
110 111 112 113	301100 301100 301200 301235 301335	23.9N 127.3E 23.9N 127.5E 24.0N 127.6E	LAND LAND LAND	POOR		5		55//1 3///2	70409 50715		0820					26.2N 24.8N 24.8N	127 125 125	. 8Ē . 3E . 3E	4793 4793 4793 4793	27 27
114 115 116 117	301235 301335 301400 301400	24.0N 127.8E 24.2N 127.8E 24.2N 127.8E 24.2N 127.7E 24.3N 128.2E	LAND LAND LAND LAND LAND	POOR POOR		5	0	3///1 65//1	50000 ⁻ 70509	MOV	0530					26 . 4N 26 . 4N 24 . 8N 26 . 2N 26 . 1N	127 127 125 127 127	.8E .3E .8E .7E	4793 4793 4793 4793 4793	31 31 27 37

118	301435	34.4N 128.0E	LAND	POOR						26.4N	127.8E	47931
119	301500	24.3N 127.9E	LAND			55//1	70511				127.8E	47937
120	301500	24.4N 128.0E	LAND			3///1	50415			24 RN	125.3E	47927
121	301535	24,5N 128.0E	LAND	POOR						26 AN	127.86	47931
122	301600	24.4N 128.4E	LAND	GOOD	45					26. 3N	126 SE	47929
123	301635	24.5N 128.5E	LAND	POOR	-10					26 AN	127.8E	47931
124	301700	24.5N 128.3E	LAND			65//1	70612			26 3N	127 05	47937
125	301700	24.6N 128.4E	LAND				50522			24 EN	127 8E 125 3E	47927
126	301735	24.6N 128.5E	LAND	POOR		3///6	20255			57.013	127.8E	4/85/
127	301800	24.6N 128.5E	LAND	FOOR		CE 4.44	70612			20.41	154.95	47931
128	301800	24.8N 128.6E	LAND	GOOD	45	6211	1001C	MAL	0320	50.51	127.8E	47937
ias	301835	24.8N 128.8E	LAND	POOR	75			110 4	0320	26.11	127.7E	47937
130	301900									25.41	127.8E	47931
		24.8N 128.9E	LAND	GOOD	45			MOV	0330	26.1N	127.7E	47937
131	305000	25.0N 129.1E	LAND				70518			56.SN	127.8E	47937
132	302100	25.2N 129.4E	LAND			6///1	20519			26.2N	127.8E	47937
133	302300	25.6N 129.7E	LAND			52341	50411			28.4N	129.5E	47909
*134	310000	25.5N 130.1E	LAND				50922			28.4N	129.5E	47989
135	310300	25.7N 130.7E	LAND			6//40	50605			28.4N	129.5E	47989
136	310400	25.8N 130.7E	LAND			6//40	50305			28.4N	129.5E	47989
137	310500	25.9N 130.7E	LAND			6//40				28.4N	129.5E	47969
138	310600	25.9N 130.9E	LAND			6///0	50911			28.4N	129.5E	47969
139	310700	25.9N 131.0E	LAND			6///0	50805			28.4N	129.5E	47909

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL STORM GORDON BEST TRACK DATA

1120002 8.0 100.2 250 1120002 8.0 110.2 30 1120182 8.0 111.0 30 1120182 8.0 111.0 35 1121002 8.0 112.1 35 1121002 8.0 112.3 35 1121182 8.0 112.6 35 1121182 8.0 112.6 35 1121182 8.0 112.7 30 1122002 8.0 112.5 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 9.0 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 10.1 112.2 30 1122182 11.0 112.2 35 1122182 11.0 112.2 35 1122182 11.0 112.2 35 1122182 11.0 112.2 40 1122502 12.2 111.0 40 1122502 12.3 110.2 40 1122502 12.3 110.2 40 1122502 12.3 110.2 40 1122502 12.3 110.2 40	0.0 0.0 0 -0.0 0 0 0 0 0 0 0 0 0 0 0 0 0	IND POSIT UIND D. 00.00.00.00.00.00.00.00.00.00.00.00.00	RRORS ST UIND POSIT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERRORS DST WIND -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1125182 13.0 108.8 30 1	3.0 108.6 25. 12. ~	5.	. 0. 0.6 0.0 0. . 0. 0.0 0.0 0. . 0. 0.0 0.0 0.	0. 0. 0.0 0.	ē āā. ā.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE E AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROF AVERAGE SPEED OF TROPICAL	ALL FORECAST WRNG 24-HR 37. 114. 16. 51. ERROR 4. 16. 23. 17. PICAL CYCLONE IS 797		TYPHOONS WHILE OVER WRNG 24-HR 48-HR 6. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	R 35 KTS	

TROPICAL STORM GORDON FIX POSITIONS FOR CYCLONE NO. 24

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1	200205	7.8N 110.2E	PCN 5	T2.5/2.5	INIT OBS	RODN
34 5	52000005005500770550000070560044000600050005000700560070066000560005	######################################	PCN 6 PCN 6 PCN 6	T2.0/2.0	COMMENTS INIT OBS INIT OBS INIT OBS ULAC 09.1N 110.1E INIT OBS ULAC 09.6N 110.1E ULAC 10.0N 110.3E EXP LLCC PART EXP LLCC ULAC 10.1N 111.7E ULAC 10.1N 111.0E EXP LLCC ULCC 11.5N 111.9E ULCC FIX PART EXP LLCC ULAC 10.3N 113. ULAC 08.9N 111.7E EXP LLCC ULAC 08.8N 112.0E ULAC 08.8N 111.2E EXP LLCC ULAC 08.9N 111.3E INIT OBS EXP LLCC ULCC FIX EXP LLCC ULCC ULAC 11.0N 111.9E ULCC FIX EXP LLCC ULCC 10.7N 111.9E INIT OBS EXP LLCC ULCC 11.2N 111.8E ULCC 11.2N 111.8E ULCC 11.6N 111.7E	PGTW PGTW PGTW
* 7 * 8 * 9	201200 201445 201600 201800	9.2N 110.5E 8.8N 110.8E 9.3N 110.5E 9.4N 110.4E	PCN 6 PCN 6 PCN 6 PCN 6	T2.0/2.0	ULAC 09.1N 110.1E INIT 08S	KGWC PGTW PGTW
* 10 * 11	201855 201855	9.4N 110.8E 9.8N 109.9E	PCN 6 PCN 5		ULAC 09.6N 110.1E	KGWC RODN Potu
13	202303	8.0N 112.0E 8.0N 112.0E	PCN 4 PCN 4		ULAC 10.0N 110.3E	KGWC RODN
15 16	210000 210145	8.0N 112.1E 8.0N 112.2E	PCN 4 PCN 3	T2.5/2.5 /D0.5/24HRS	EXP LLCC	PGTW KGWC PODN
18 19 * 20	210300 210600 210740	8.6N 112.2E 8.8N 112.5E 9.2N 113.1E	PCN 4 PCN 6 PCN E	T2.5/2.5 /D0.5/24HRS	PART EXP LLCC	PGTU PGTU KGUC
* 21 * 22 * 23 * 24	210900 211143 211200 211425	9.4N 112.6E 10.0N 113.7E 9.8N 112.1E 9.9N 113.2E	PCN 6 PCN 6 PCN 6 PCN 4		ULAC 10.1N 111.7E ULAC 10.1N 111.0E EXP LLCC	PGTW KGWC PGTW KGWC
* 25 * 26 * 27	211426 211600	10.3N 112.7E	PCN 5 PCN 6	T2.5/2.5 /D0.5/24HRS		RODN PGTU PGTU
* 28	211844 211844	10.3N 113.4E 11.1N 112.6E	PCN 6 PCN 5		ULCC 11.5N 111.9E	KGUC RODN
31 32	212242 220000 220300	10.6N 113.5E 9.9N 112.6E 9.1N 113.3E	PCN 6 PCN 6 PCN 6	T1.5/2.5+/W1.0/24HRS	ULCC FIX	PGTW PGTW
33 34	220306	8.9N 113.5E 9.0N 112.9E	PCN 3 PCN 6	T2.5/2.5 /S0.0/25HRS	PART EXP LLCC ULAC 10.3N 113.	KGUC PGTU KGUC
* 35 * 37	220900 221055	9.2N 112.8E 9.7N 114.5E	PCN 6 PCN 6			PGTW
38 39 * 40	221122 221200 221405	9.0N 113.1E 9.2N 112.5E 9.3N 113.4F	PCN 6 PCN 6 PCN 4		ULAC 08.9N 111.7E	KGMC KGMC
41	221600	9.0N 112.5E 9.2N 112.6E	PCN 6 PCN 6	T1.5/2.5 /W1.0/24HRS	EAF 6500	PGTU PGTU
* 43 * 44 * 45	221833 222220 222220	8.5N 113.1E 8.6N 113.0E 9.7N 110.8E	PCN 4 PCN 6 PCN 6		ULAC 08.8N 112.0E ULAC 08.6N 111.2E	KGWC KGWC Rodn
46 47	230000 230245	9.2N 112.1E 9.0N 112.4E	PCN 4 PCN 5	T2.5/2.5 /S0.0/24HRS	EXP LLCC Ulac 09.0N 111.3E	PGTW KGWC
- 49 50	530300 530300	8.9N 112.4E 9.4N 112.6E	PCN 6 PCN 4	T2.0/2.0 /D0.5/24HRS	EXP LLCC	PGTW
51 52 53	230719 230900 231031	9.5N 112.9E 9.6N 112.8E 10.7N 111.8F	PCN 3 PCN 6 PCN 6		EXP LLCC ULAC 09.9N 111.4E	KGUC PGTW Rodn
54 55	231100	10.1N 112.6E 9.8N 112.7E	PCN 4 PCN 5		EXP LLCC ULAC 11.0N 111.9E	RODN
58	231526 231526 231600	10.5N 112.1E 10.5N 112.5E	PCN 4 PCN 6	T2.5/2.5	INIT OBS EXP LLCC ULCC 11.2N 111.8E	KGWC PGTW
59	231800	10.6N 112.4E	PCN 6	T2.5/2.5 /D1.0/26HRS	ULCC 11.6N 111.7E	PĞTÜ

6612334566789901	211590 211590 211200255 211200255 21022200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 2102200 200200 200200 200200 200200 200200	10.7N 112.3E 10.6N 112.3E 10.6N 112.3E 10.6N 112.3E 10.8N 112.3E 10.8N 112.4E 10.8N 112.3E 10.2N 112.3E 11.1N 112.3E 11.1N 112.3E 11.1N 112.3E 11.1N 112.3E	644499469960 77777777777777 9000000000000000000	T2.5/2.5 /S0.0/24HRS T2.5/2.5 /D0.5/24HRS T2.5/2.5 /D0.5/24HRS	EXP LLCC ULAC 11.3N 110.9E EXP LLCC PART EXP LLCC ULAC 11.2N 111.	PKGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
712 773 775 776 778 789	241239 2412306 24125006 24125000 24125000 250250 250360	11.9N 112.9E 11.9N 112.3E 11.5N 112.3E 11.5N 112.3E 11.6N 112.3E 11.8N 112.3E 12.3N 110.3E 12.3N 110.3E	7665664566	T2.5/2.5 /S0.0/22HRS T3.0/3.0 /D0.5/24HRS T3.0/3.0-/D0.5/24HRS	ULCC 12.2N 110.8E	RODIU PGTUU PGOTUU PGTUU PGTUU PGTU
* 85 * 85 * 85 * 85 * 85	250900 251200 251446 251943 252100 260000	12.3N 109.8E 13.0N 108.6E 13.9N 108.0E 13.9N 108.0E 12.3N 108.0E 12.9N 108.8E 13.5N 108.9E	PCN 6 6 5 5 6 6 PCN		ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW RODN RODN PGTW PGTW

AIRCRAFT FIXES

FIX TIME FIX POSITION FLT 700MB OBS MAX-SFC-WIND MAX-FLT-LVL-WIND ACCRY EYE DIAM/TATION OUT/ IN/ DP/SST NO.

1 220454 9.3N 112.5E 1500FT 1006 25 270 42 190 27 090 78 2 23 +24 +24 +24 +24 +26 1 2 230115 9.4N 112.4E 1500FT 1003 35 130 90 250 43 130 110 0 15 +23 +24 +22 27 2 2 40155 10.8N 112.4E 1500FT 1002 45 220 30 250 37 170 45 2 3 +26 +26 +26 26 2 3

TYPHOON HOPE BEST TRACK DATA

1217002 9.2 140.0 20 0.0 1217062 9.4 1439.4 25 0.0 1217062 9.4 139.4 25 0.0 12171062 9.4 139.4 25 0.0 12171062 9.4 139.8 25 0.0 1217128.7 19.1 138.8 3 3 5 0.0 10.1 1217128.7 19.1 138.8 3 3 5 0.0 10.1 1217128.7 19.1 138.8 3 3 10.0 10.1 1218128.2 10.1 136.7 5 5 10.0 10.1 1218128.2 10.1 136.5 6 75 10.0 12191002 12.1 136.5 6 75 12.3 1219102 12.7 136.5 6 75 12.3 1219102 12.7 136.5 6 75 12.3 1219102 13.4 133.6 6 75 13.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 133.6 13	137. 6 40. 12. 0. 11. 6. 13. 6. 13. 6. 13. 6. 14. 6. 11. 7. 137. 6. 9. 55. 18. 0. 11. 7. 136. 3. 5. 5. 18. 0. 11. 7. 136. 3. 5. 5. 18. 0. 11. 136. 3. 6. 18. 0. 15. 1. 136. 18. 7. 5. 13. 0. 15. 1. 136. 18. 7. 5. 13. 0. 15. 1. 1336. 18. 7. 5. 13. 0. 15. 1. 1336. 18. 7. 5. 13. 0. 14. 0. 13. 136. 18. 7. 5. 13. 0. 14. 0. 13. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 18. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7. 136. 7.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 -0 0 0 1 1 24 1 24 1 24 1 24 1 24 1 24 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
122312Z 19.1 128.8 70 19.3 122318Z 18.5 130.2 60 19.9 122400Z 18.2 130.8 50 18.1	128.3 75. 31. 5. 0.0 129.5 70. 93. 10. 0.0 130.8 50. 6. 0. 0.0	0.0 00. 0. 0.0 0.0 00. 0. 0.0	9 0.0 00. 0.	0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY HAGNITUDE ERROI AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYC	19. 123. 201. 19. 19. 19. 19. 19. 19. 19. 19. 19. 1	-HR WRNG 2 9. 19. 12 2. 15. 8 5. 3. 1	S WHILE OVER 35 KTS 24-HR 48-HR 72-HR 23. 201. 159. 33. 124. 102. 44. 15. 15. 661210. 22. 18. 14	

TYPHOON HOPE FIX POSITIONS FOR CYCLONE NO. 25

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
* 1	162100	7.9N 138.3E	PCN 6	T1.0/1.0	INIT OBS	PGTW
3	170441	9.3N 139.5E 9.2N 140.4E	PCN 6	T2.0/2.0	INIT OBS	PGTU
7567 8	170900 171200 171600 172100	9.8N 139.2E 10.2N 138.6E 10.8N 138.3E 10.8N 137.7E	@@@@@@@@@@@@@@@@######################	T2.0/2.0-/D1.0/19HRS	ULCC 10.3N 137.6E	PGTU PGTU PGTU PGTU
10 11 12 13	180000 180103 180300 180600	10.5N 137.3E 10.7N 137.9E 10.5N 137.1E 10.6N 137.0E 10.8N 137.2E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.0/2.0 T3.0/3.0 /D1.0/22HRS	INIT OBS	RPMK PGTW PGTW PGTW
14 15 16 17	181200 181344 181716 182100	11.2N 137.1E 11.0N 137.2E 11.3N 136.5E 11.4N 136.5E	PCC 66	T4.0/4.0 /D2.0/25HRS		PGTW PGTW PGTW PGTW PGTW
19 20 21 22	190300 190600 190601 190900	12.4N 136.3E 12.8N 136.2E 12.8N 136.2E 12.8N 136.0E	PCN 2 PCN 2 PCN 3 PCN 4	T4.5/4.5-/D1.5/24HRS	BANDNG TYPE EYE BANDNG TYPE EYE INIT OBS DEVLPNG EYE INIT OBS DEVLPNG EYE	PGTW PGTW RODN PGTW
23 24 25 26 27	191200 191223 191600	13.1N 135.8E 13.2N 135.9E 14.2N 135.7E 13.7N 135.3E	PCN 4 PCN 2 PCN 5 PCN 6 PCN 4	T4.5/4.5 T4.5/4.5 /D0.5/23HRS	DEVLPNG EYE Init obs Devlpng eye	PGTW PGTW PGTW PGTW
28 29	192100	13.7N 134.5E 13.7N 134.1E	PCN 4 PCN 4		EYE	PGTW PGTW
012245678901224567890122745678901224 11111111112222222222222227777777777	0311000000300004460000010300700002200200000000000000000000	### ##################################	-4-4-0000-00-00-00-00-00-00-00-00-00-00-	T4.0/4.0 T5.0/5.0 /D0.5/24HRS	COMMENTS INIT OBS INIT OBS ULCC 10.3N 137.6E INIT OBS BANDING TYPE EYE BANDING TYPE EYE INIT OBS DEVLPING EYE INIT OBS DEVLPING EYE EYE BANDING EYE EYE 30NM INIT OBS BANDING EYE EYE 35NM RGD EYE RGD EYE DVLPING EYE ULCC FIX ULCC FIX ULCC FIX	RPMK PGTW PGTW RPMK PGTW PGTW
36 37 38 39	200900 200952 201200 201303	13.7N 132.1E 13.7N 131.5E 13.8N 131.3E 13.8N 130.7E	PCN 4 PCN 2 PCN 6 PCN 6		RGD EYE	PGTW PGTW PGTW PGTW
40 41 42 43	201600 201836 201836 202100	13.9N 130,5E 14.1N 130.2E 13.9N 130.0E 13.8N 130.6E	PCN 4 PCN 4 PCN 6	14.5/4.5 /50.0/24HRS	DYLPNG EYE	PGTU RODN PGTU PGTU
45 46 47	210000 210143 210300 210540	13.4N 129.8E 13.6N 128.4E 13.8N 128.3E 13.7N 127.9E	######################################	T4.5/5.0 /W0.5/24HRS		PGTW PGTW PGTW PGTW
48 49 50	210900	14.3N 127.9E	PCN 6		HLCC FIX	PĞTU PĞTU
51 51	211424	14.5N 126.5E	PCN 5	TO E/A E /U1 0/04UDG	HICC FIX	RPMK PGTU
53	211800	14.5N 126.4E	PCN 6	13,377,3 /W1,0/67883	ULCC FIX	PGTW RODN
52 53 55 55 56	212100	14.6N 126.0E 15.0N 125.7E	PCN 6 PCN 4	T3.0/4.0 /W1.0/21HR9	1	PGTU RPMK

57 58 59 61 62 63	220000 15.0N 125 220123 15.3N 125 220123 15.4N 125 220123 15.4N 126 220529 15.9N 125 220600 16.9N 125 220900 16.3N 125	9E PCN 3 9E PCN 5 9E PCN 6 9E PCN 6	T3.5/3.5 T3.5/4.5 /W1.0/24HRS	INIT OBS	PGTW RPMK RODN PGTW RODN PGTW
64 65 66 67 68 69 70	221200 16.3N 125. 221200 16.7N 125. 221405 16.1N 126. 221600 17.3N 125. 221815 17.5N 125. 221816 17.5N 125. 221100 17.8N 126.	9E	T3.0/4.0 /W0.5/24HRS		PGT STAND
71 72 73 74 75 76 77	222149 17.9N 126 230000 18.2N 126 230103 18.2N 126 230300 18.5N 126 230518 18.8N 126 230600 18.7N 126 230900 18.7N 127 231029 19.3N 127	SE PCN G SE PCN 3 7E PCN G SE PCN 3	T3.5/3.5-/D0.5/27HRS T3.5/3.5-/S0.0/24HRS T4.0/4.0-/D0.5/28HRS		RPMK PGTW RPMK PGTW
78 79 80 * 81 * 82 * 83	231200 19.7N 128 231343 18.2N 128 231600 20.4N 129 231800 20.5N 130 231804 22.3N 132 232128 18.7N 130	9E PCN 6 3E PCN 6 2E PCN 6 9E PCN 5 8E PCN 4	T3.5/3.5 T2.5/3.5-/W0.5/24HRS T2.0/3.5 /W1.5/21HRS	INIT OBS ULCC FIX EXP LLCC ULCC FIX ULCC FIX EXP LLCC ULCC 22,0N 133,3E	PGGMAN PGGMAN PGGMAN PGGMAN PGGMAN PGGMAN RPMAN
85 86 88 88 89 90	240000 17.8N 130 240042 18.0N 130 240300 18.0N 131 240500 17.9N 131 240900 17.6N 131 241200 17.6N 131	8E PCN 4 9E PCN 3 2E PCN 4 5E PCN 4 6E PCN 4	T1.5/1.5	EXP LLCC INIT OBS EXP LLCC EXP LLCC	PGTW RKSO PGTW PGTW PGTW PGTW

AIRCRAFT FIXES

FIX NO.	TIME	FIX POSITION	FLT	700MB HGT	OBS MSLP	MAX-SFC VEL/BRG		MAX-FLT-U			EYE SHAPE	EYE ORIEN- DIAM/TATION	EYE TEMP (C) OUT/ IN/ DP/SST	MSN NO.
123456789011234567	180003 180229 182100 182337 150653 150123 200060 200060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 20060 2006	10.3N 137.7E 10.5N 137.7E 11.7N 136.8E 11.7N 136.8E 11.9N 136.1E 13.8N 136.1E 13.6N 134.9E 13.6N 134.9E 13.6N 134.9E 13.6N 120.6E 13.8N 127.8E 13.8N 127.8E 13.8N 127.8E 13.8N 127.8E 17.9N 126.6E	1500FT 1500FT 1500MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB 700MB	71199933 788888933444346633 788888594585946633	996 992 975 9764 964 958 950 971 978 999	50 330 40 350 70 250 70 270 100 080 100 080 100 080 100 170 70 160 100 160 160 160 160 160 160 160 160 160 160	5050005055 00050 500801011 44005	020 50 300 36 090 36 260 67 190 74 320 18 120 18 12	235350 275350 275350 275350 275350 2750 2750 2750 2750 2750 2750 2750 27	34670023111113205040	CIRCULAR CIRCULAR ELLIPTICAL ELLIPTICAL ELLIPTICAL CIRCULAR	25 20 030 50 40 140	+25 +25 +252 +25 +264 +122 +122 +137 +112 +133 +137 +114 +13 +137 +114 +12 +224 +112 +12 +224 +12 +12 +225 +152 +12 +215 +152 +12 +215 +152 +13 +146 +111 +14 +164 +111 +14 +17 +18 +25 +17 +18 +25 +17 +18	1122375556678822374

TROPICAL STORM IRVING BEST TRACK DATA

MO / 160627 12166127 12166127 12161282 12171282 12177622 12177622 12177128 1217128 12180627 1219128 1219128 1229062 1219128 1229062 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 12290128 122901	NO. ST. T. T	WARNIND 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	24 HOUR FOR ECAST POSIT UIND DET 0. 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0	## HOUR FOR ECAST D POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	72 HOUR FORECAST ERRORS 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AVG RIGHT AVG INTER AVG INTER NUMBER OF DISTANCE	CAST POSIT ERROR SANGLE ERROR ISITY HAGNITUDE SITY BIAS FORECASTS TRAVELED BY TRO SPEED OF TROPICA	18. 73. 4 ERROR 2. 10. 1 2. 9. 1 14 12 1	-HR 72-HR URNG 3. 170. 0. 1. 51. 0. 7. 28. 6.	HOONS UHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0. 0 0. 0 0. 0 0. 0 0. 0 0.	

TROPICAL STORM IRVING FIX POSITIONS FOR CYCLONE NO. 26

FIX No.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2	160600 160900 161200	7.6N 114.5E	PCN 6 PCN 6 PCN 6	T1.0/1.0	INIT OBS	PGTW PGTW
23456	161200 161600 161800 162100	7.4N 115.1E 7.5N 114.7E 7.6N 114.9E 7.6N 115.3E	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW PGTW PGTW
7 8	170000 170600	7.6N 115.5E 7.9N 115.1E	PCN 6	T2.5/2.5-/D1.5/24HRS		PGTW PGTW PGTW
10	171056	7.8N 115.6E 7.8N 115.6E	PCN 3	T3.0/3.0	INIT OBS	RODN PGTW
12 13 14	171404 171600 171909	8.2N 115.5E 8.1N 115.2E 7.9N 115.2E 8.6N 114.6E	19000000000000000000000000000000000000	T2.5/2.5-/D1.0/24HRS	PART EXP LLCC	RODN PGTU RODN PGTU
16 17	180000 180300	8.1N 114.6E 8.1N 114.3E	PCN 6 PCN 6	T3.0/3.0 /D0.5/21HRS		PGTW
18 19 20	180600 180613 180900	8.1N 114.3E 8.0N 114.2E 8.1N 114.1E	PCN 6 PCN 5 PCN 6	T3.5/3.5	INIT OBS	RODN PGTU PGTU
21 22 * 23 24	181200 181800 181858 182100	8.0N 113.9E 7.9N 113.8E 9.2N 113.8E 7.7N 113.6E	19999999999999999999999999999999999999	T3.0/3.0-/D0.5/26HRS T3.0/3.0	INIT OBS	PGTW RODN PGTW RPMK
01123456789012345678901234567899 **	161600 161800 161800 1700600 17700600 17700600 1771200 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17714600 17	8.2N 113.6E 8.2N 113.6E 8.6N 113.3E 8.7N 111.9E	PC	T2.5/3.0 /U0.5/24HRS	ULCC FIX	PGTW PGTW PGTW PDMK
30 31	191013 191200	8.7N 113.2E 8.8N 112.6E	PCN 4 PCN 6	T2.5/3.0 /W0.5/22HRS		PGTW PGTW
32 33	191600 191800	8.6N 112.1E	PCN 6	T2.5/3.0 /W0.5/24HRS		PGTW RODN
35 36	192100	8.9N 111.4E 9.0N 111.5E	PCC	T2.5/3.0 /W0.5/20HRS		PGTW RPMK
37 38	200000 200204	9.3N 111.4E 9.0N 109.9E	PCN 6 PCN 5			RPMK PGTU
39 40 41	200204 200300 200600 200900	9.3N 110.3E 9.5N 110.0E 9.4N 109.8E	PCN 6 PCN 6	T3.0/3.0-/D0.5/24HRS		PĞTÜ PĞTÜ RPMK
42 43 44	200900 201133 201200 201444 201600 201800	9.3N 109.8E 9.6N 109.3E 9.1N 109.2E 9.4N 109.2E	PCN 5 PCN 6 PCN 5 PCN 6	T2.5/2.5 /S0.0/24HRS	PART EXP LLCC	PGTW RPMK PGTW PGTW
47 48	202100	9.6N 108.8E 9.3N 108.5E	PCN 6 PCN 4	T2.0/2.5 /W0.5/24HRS	PART EXP LLCC	PGTW RPMK
456 478 499 55555555555555557	2002005000040000121200005000040000120000000000	######################################	######################################	T2.0/2.5 /W1.0/24HRS	EXP LLCC PART EXP LLCC EXP LLCC EXP LLCC EXP LLCC	
55 56 57	211424 211600 211800	6.7N 106.5E	PCN 6	T2.0/2.5 /W0.5/24HRS	EXP LLCC	RPMK PGTU PGTU PGTU
58 59	220600	6.5N 106.1E 5.0N 104.8E	PCN 6 PCN 6	T0.0/1.0 /W2.0/27HRS	EXP LLCC	PGTW

AIRCRAFT FIXES

2. NORTH INDIAN OCEAN CYCLONE DATA



0523182 18.3 89.3 45 17.8 9524062 19.0 89.7 45 18.5 0524462 19.7 90.0 50 19.8 0524182 20.5 90.4 55 20.5 0524182 21.4 90.9 60 21.0 0525002 22.5 91.2 60 22.4	WARNING ERRORS IT WIND DST WIND 0.00 -0.00.00 0.00 -0.00.00 88.0 40.52.018.7 88.9 45.38.0.19.3 88.6 50.69.5.20.3 90.00 50.6.0.22.7 90.2 55.11.0.0.0 90.4 60.37.0.0.0 91.4 40.43.10.0	6 6 6 -6 3 0 0 0 0 -0 3 0 0 0 0 -0 9 0 0 0 0 -1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	48 HOUR FORECAST POSIT WIND DST UIND 0.0 0.0 0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0 0.0 0.0 0 -0.0	72 HOUR FORECAST ERRORS POSIT UIND DST WIND 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCL	33. 134. 0. 14. 29. 0. 2. 11. 0. 2. 11. 0. 8 4 0	72-HR URNG 0	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 01B FIX POSITIONS FOR CYCLONE NO. 1

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
103456789	2124712 22217206 2221720100 22217201000 223172010000 2231720000000000000000000000000000000000	13.7N 89.1E 15.2N 89.6E 15.5N 87.3E 16.6N 87.8E 16.6N 87.8E 16.9N 87.7E 16.9N 87.7E	######################################	T1.5/1.5 T2.5/2.5 T2.0/2.0 /D0.5/24HRS T3.0/3.0 /D1.5/24HRS	INIT OBS ULAC 15.5N 89.9E INIT OBS INIT OBS	E COCETO CE COCE
* 10 * 11 * 12 * 13 * 15 * 16 * 17 * 18	231600 231652 231800 232100 232100	15.5N 87.5PE 16.6N 877.5PE 16.6N 877.5PE 16.6N 877.5PE 16.6N 877.6E 17.2N 877.6E 17.2N 877.6E 17.5N 879.6E 17	PCN 6	T3.0/3.0 /D0.5/24HRS T2.5/2.5 /D0.5/24HRS	ULAC 17.4N 087.2E ULCC FIX ULAC 16.8N 89.1E ULCC FIX ULAC 18.4N 89.3E	KGWC PGTW KGWC PGTW
99912374567899	103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 103500 10	20.0N 90.1E 19.9N 89.3E 20.3N 90.3E 20.1N 89.7E 20.6N 90.9E 20.7N 90.9E 20.7N 90.9E	######################################	T3.0/3.0 /S0.0/24HRS T3.5/3.5 /D0.5/24HRS T3.5/3.5 -/D1.0/24HRS	ULAC 19.1N 90.0E ULAC FIX ULCC 18.4N 90.0E ULAC 21.0N 90.3E	PEGENERAL PER
* * * * * * * * * * * * *	242044 242100 2500028 25003331 25063331 250648 251308	22.3N 91.4E 22.3N 91.4E 22.3N 91.7E 21.2N 90.7E 21.2N 91.4E 23.5N 91.4E 24.0N 91.6E 24.0N 92.7E	00000000000000000000000000000000000000		ULAC 22.6N 091.4E	AGUU AGUU AGUU AGUU AGUU AGUU AGUU AGUU

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 02A BEST TRACK DATA

BEST TRACK HO/DA/HR	WARNING ERRORS SIT WIND DST WIND 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 -0.0 0.0 0.0 0.0 0 0 -0.0 0.0 0.0 0.0 0 0 -0.0 0.0 0.0 0.0 0 0 -0.0 0.0 0.0 0.0 0 0 -0.0 0.0 0.0 0.0 0 0 0 0 0.0 0.0 0.0 0 0 0	70.3 45. 135. 0. 68.8 60. 29. 15. 68.1 60. 61. 20. 68.8 60. 53. 20. 69.9 50. 81. 15.	48 HOUR FORECAST ERRORS 0.0 1.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST ERRORS POSIT UIND DST UIND 0 0 0 0 0 -0 -0 0. 0 0 0 0 0 -0 0. 0 0 0 0 0 -0 0. 0 0 0 0 0 0 0 0. 0 0 0 0 0 0 0 0. 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	24. 61. 115. 14. 38. 0.	72-HR URNG 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 02A FIX POSITIONS FOR CYCLONE NO. 2

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3	260634 261733 270617 271712	11.1N 64.6E 12.0N 66.4E 13.1N 69.0E 14.6N 69.5E	PCN 5 PCN 6 PCN 5 PCN 6	T1.5/1.5 T1.0/1.5 /W0.5/24HRS	INIT OBS	KGWC KGWC
4 5 6 7 8	280553 281345 281833 282143	15.0N 67.1E 16.0N 67.0E 16.5N 67.8E 17.1N 67.6E	PCN 3 PCN 4 PCN 3 PCN 6	T2.0/2.0 /D1.0/24HRS T3.0/3.0	EXP LLCC ULAC 14.9N 66.0E EXP LLCC ULAC 15.2N 65.5E INIT OBS ULAC 15.9N 62.6E	KGWC KGWC KGWC
* 9 10 11 12 13	290225 290533 291029 291324	18.3N 68.4E 17.9N 68.1E 18.4N 67.5E 18.3N 67.4E	PCN 5 PCN 5 PCN 5 PCN 6	T3.0/3.0 /D1.0/24HRS	ULAC 17.4N 67.5E ULAC 18.2N 66.5E	KGUC KGUC KGUC
13 14 15	291813 292132 300205 300512	19.4N 68.6E 19.9N 68.8E 20.5N 68.8E 21.4N 68.3E	PCN 3 PCN 6 PCN 5 PCN 5	T3.0/3.0 /S0.0/24HRS T2.0/3.0 /W1.0/24HRS	ULAC 19.0N 67.1E ULAC 20.0N 67.7E ULAC 20.9N 67.4E	KGUC KGUC KGUC
17 18 19	301018 301444 301753 302303	21.3N 68.0E 21.6N 68.6E 22.0N 68.1E 22.8N 68.7E	75 MO9 R MO9 R MO9 P MO9 P MO9	T1.5/2.5 /W1.5/24HRS	ULAC 20.5N 65.5E + ULAC 21.1N 66.8E EXP LLCC	KGWC KGWC KGWC
1456789012345	310143 310452 311423	23.3N 68.4E 23.2N 68.3E 24.1N 69.1E	PCN 5 PCN 3 PCN 6	T1.0/2.0 /W1.0/24HRS	EXP LLCC	KGMC KGMC KGMC
25	311838 010432	24.6N 68.7E 24.9N 70.2E	PCN 5 PCN 5			KGWC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 038 BEST TRACK DATA

100906Z 12.8 90.8 20 0.0 100906Z 13.8 90.1 25 0.0 100906Z 13.8 90.1 25 0.0 100913Z 14.2 88.6 30 0.0 100913Z 14.5 86.9 35 14.3 8101006Z 15.1 85.7 40 14.9 8101006Z 15.8 85.7 40 14.9 8101016Z 16.4 84.3 45 16.3 8101018Z 17.2 83.7 50 17.1 8101100Z 18.0 83.3 50 17.8 85 17.8	UARNING ERRORS IT UIND DST UIND PO 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 00. 0. 0. 0.0 0. 0. 0. 0. 0.0 0. 0. 0. 0. 0.0 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	24 HOUR FORECAST ERRORS SIT WIND DST VIND 0.0 00. 0. 0.0 00. 0. 0.0 00. 0. 83.8 50. 78. 0. 80.7 30. 16020. 79.6 25. 18410. 0.0 00. 0. 0.0 00. 0. 0.0 00. 0. 0.0 00. 0.	48 HOUR FORECAST ERRORS 0 0 0 0 0 -0 0 0 0 0 0 0 0 -0 0 0 0 0 0	72 HOUR FORECAST ERRORS D POSIT MIND DST MIND 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0 0.0 0.0 0.00.0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL C AVERAGE SPEED OF TROPICAL CYCLO	26. 141. 0. 20. 42. 0. 1. 10. 0. -110. 0. -7. 3. 0.	2-HR URNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS UHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 03B FIX POSITIONS FOR CYCLONE NO. 3

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
123456789901234567899012334 ** *	081600 081800 090000 090300 090429 090838 090838 091209 091209 091200 0912100 0912100 100409 110348 110348 111246 111246 111246 111246 111240 111240	91 53EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	66666666666666666666666666666666666666	T1.0/1.0 T1.5/1.5 T1.5/1.5 T2.5/2.5 T2.5/2.5 /D1.5/26HRS T2.5/2.5 /D1.0/24HRS T3.5/3.5 /D1.0/24HRS	INIT OBS ULAC 13.5N 089.2E INIT OBS ULAC 13.5N 089.2E INIT OBS ULCC 13.8N 087.9E ULCC FIX ULCC FIX ULCC 14.2N 088.2E INIT OBS ULAC 14.4N 086.8E ULAC 51.2N 085.0E ULAC 15.8N 085.0E ULAC 15.7N 084.6E PART EXP LLCC ULAC 16.3N 083. ULAC 16.4N 083.1E ULAC 18.6N 080.1E ULAC 18.6N 080.1E	######################################

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 04B BEST TRACK DATA

101600Z 20.6 86.8 50 20.5 101606Z 21.3 86.2 40 21.3	UARNING ERRORS II	24 HOUR FORECAST ERRORS D POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	48 HOUR FORECAST POSIT WIND DST WIND 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0 0.0 0.0 0 -0 0.0	72 HOUR FORECAST ERRORS 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCL	8. 0. 0 0. 0. 0 4. 0. 0 CYCLONE IS 296. N	-HR 72-HR WRNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS UHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 04B FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
123456789011234567890 * * * 11111112	00000000000000000000000000000000000000	29.99.90.90.90.90.90.90.90.90.90.90.90.90		T0.5/0.5 T0.5/0.5 T1.5/1.5 T1.5/1.5 T1.5/1.5 T1.0/1.5 /W0.5/25HRS T1.0/1.0 /S0.0/24HRS T2.5/2.5	ULCC FIX INIT OBS ULCC FIX ULCC FIX INIT OBS ULCC FIX INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS INIT OBS ULAC 14.8N 091.6E INIT OBS ULAC 19.7N 086.7E ULAC 20.0N 086.5E	00000000000000000000000000000000000000

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 058 BEST TRACK DATA

1115122 12.8 85.5 35 12.8 1115182 12.7 85.0 35 12.8 1116002 12.6 84.4 40 12.8 111602 12.7 83.7 45 12.7 1116122 13.0 83.0 50 12.6 1117002 13.9 81.0 50 12.6 1117002 14.7 80.1 55 13.8 1117122 15.4 79.8 45 15.0 1117182 16.2 79.9 35 15.8	ERRORS	0 -0 0 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST SPORE ERRORS ND 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCLO		TYPHOONS WHILE OVER 35 KTS URNG 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 05B FIX POSITIONS FOR CYCLONE NO. 5

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
						3116
1 2 3 4	130427 131708 132153 132351	11.8N 81.6E 11.8N 82.6E 12.8N 82.8E	PCN 3 PCN 6 PCN 6 PCN 6	T1.5/1.5	INIT OBS EXP LLCC	KGWC KGWC KGWC
5 6 7 8	140407 140856 141231 141647 142142	81.6E 111.88	PCN 3 PCN 3 PCN 6	T1.0/1.5 /W0.5/24HRS	EXP LLCC EXP LLCC	KGMC KGMC KGMC
10 11	142142 150111 150347 150846		PCN 6 PCN 5 PCH 5	T2.5/2.5 /D1.5/24HRS	ULAC 14.1N 086.7E ULAC 13.4N 086.7E ULAC 13.1N 086.3E	KGWC KGWC KGWC
13 14	150846	12.6N 86.3E 12.6N 86.3E 12.6N 86.1E 12.2N 86.1E 12.2N 84.1E	PCN 5 PCN 5 PCN 6	T2.5/2.5 /D1.0/24HR5		KGWC FJDG KGWC
16	151627 152131 160050	12.4N 84.1E	PCN 6 PCN 6	T2.5/2.5	INIT OBS	KGWC
17 18 19	160326 160829	12.7N 84.4E 12.5N 83.9E 12.0N 82.9E	PCN 6 PCN 5	T3.0/3.0 /D0.5/24HRS	ULAC 12.0N 085.6E ULAC 11.9N 085.1E	KGWC KGWC KGWC FJDG
4567890111111111111111111111111111111111111	160835 161329 161607 162120	102.45 102.45 102.45 102.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45 103.45	PCN 5 PCN 6 PCN 6	T3.0/3.0 /D0.5/24HRS	ULAC 12.5N 084.3E ULAC 12.5N 084.3E ULAC 12.2N 084.0E ULAC 12.8N 082.5E ULAC 13.2N 081.8E ULAC 14.9N 081.5E ULAC 15.2N 080.5E ULAC 15.4N 079.8E	KGWC KGWC KGWC KGWC
25	170028 170447 170824 171308 171728	13.8N 80.6E 14.5N 81.0E 15.2N 79.9E 15.4N 79.7E	PCN 6 PCN 5 PCN 6	T4.0/4.0 /D1.0/24HRS	ULAC 13.2N 081.8E ULAC 14.9N 081.5E ULAC 15.2N 080.5E ULAC 15.4N 079.8E	KGUC KGUC KGUC KGUC
29 30	172107 180007	16.5N 79.6E 16.4N 79.5E 17.1N 81.0E	PCN 5 PCN 5 PCN 5 PCN 5		ULAC PSBL 17.0N 082.1E	KGWC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 06B BEST TRACK DATA

MO/DA/HR	RORS UIND FOSIT UIND DST UIND POSIT UINI DST UIND DST UIN	72 HOUR FORECAST ERRORS 0.0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR 24-HR AVG RIGHT ANGLE ERROR 16. 57. AVG INTENSITY MAGNITUDE ERROR 1. 57. AVG INTENSITY BIAS 14. NUMBER OF FORECASTS 11 6. DISTANCE TRAVELED BY TROPICAL CYCLONE IS	48-HR 72-HR URNG 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 06B FIX POSITIONS FOR CYCLONE NO. 6

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567890112345	080801 090406 090600 091200 091600 091800 092035 092100 100000 100300 100345 100500 100900	4.0X 4.0X 4.0X 4.0X 4.0X 4.0X 4.0X 4.0X	55666666665656666666666666666666666666	T1.5/1.5 T1.5/1.5 T1.0/1.0 T1.0/1.0 T1.0/1.0	INIT OBS INIT OBS ULAC 03.7N 090.4E INIT OBS ULCC FIX ULCC FIX INIT OBS ULCC 04.0N 089.7E ULCC 04.9N 091.3E ULAC 05.0N 091.2E ULAC 05.2N 090.7E	######################################

* 16789012934 128222934	101200 5. 101600 6. 101626 6. 101820 6. 102024 6. 102100 6.	0465846240 0465846240 09000000000 090000000000000000000000	00000000000000000000000000000000000000	T2.0/2.0 /D1.0/24HRS T2.5/2.5	ULAC 05.6N 089.7E ULAC 05.3N 089.6E INIT 0BS ULAC 05.6N 090.4E ULAC 06.3N 090.3E ULAC 06.8N 090.0E	KGGTTUCUUCUUCUUCUUCUUCUUCUUCUUCUUCUUCUUCUUC
2456789	110300 7 110325 7 110600 7	.2N 89.2E	PCN 6 PCN 5 PCN 6	T2.0/2.5 /W0.5/24HRS T2.0/2.0 /S0.0/27HRS		KGWC PGTW
30 31 32 33	110902 8 110910 8 111200 8	99939845 88993984548 88998984548 88998984548 889989898 8998989898 8998989898989898	PCN 6 5 6 PCN 6 PC	T3.5/3.5+/D2.0/27HRS	PART EXP LLCC ULAC 07.9N 088. ULCC FIX ULAC 08.2N 087.1E	FJDG KGWC PGTW KGWC
334 34 35 36 * 37	111600 8 111605 9			T2.5/2.5 /D0.5/24HRS T3.0/3.0 /D0.5/24HRS	ULAC 08.8N 086.4E ULCC FIX ULAC 10.5N 084.7E	
38 39 40	120002 10	85.3E 85.3E .3N 85.3E .0N 84.9E .0N 85.0E	1666556 PPCC PPCC PPCC PPCC	T3.0/3.0 /D1.0/25HRS	ULAC 09.6N 085.1E ULAC 09.3N 084.5E	PGTW KGWC KGWC PGTW
41 42 43 44 45	120859 10 120900 9 121200 10	.4N 84.0E .8N 84.2E .4N 84.1E	PCN 5	T3.5/3.5 /S0.0/24HRS	ULAC 10.0N 083.9E ULCC FIX	FJDG KGUC PGTW PGTW KGUC PGTW
45 46 47 48 49	121600 10 121727 11 122145 12	.4N 84.0E .9N 83.2E .9N 83.7E .4N 83.0E	PCN 6 PCN 5 PCN 5 PCN 5 PCN 6	T2.5/3.0 /W0.5/24HRS	ULCC FIX ULAC 11.1N 083.7E ULCC FIX ULAC 11.0N 083.6E ULAC 11.3N 082.5E	KGUC KGUC KGUC KGUC
50 51 52	130122 12 130426 12 130848 13	.3N 82,3E .6N 82,0E .1N 81.6E	PCH 6 PCH 5 PCH 6 PCH 5	T3.0/3.0 /W0.0/24HRS	ULAC 13.9N 081.6E	F 111172
512345678 55555555555555	131221 13 131706 14 132134 14	.8N 81.3E .1N 80.6E .6N 80.5E .8N 78.8E .6N 79.0E	PCN 6 PCN 6 PCN 6 PCN 5 PCN 5	T3.0/3.0 /D0.5/24HRS	ULAC 13.4N 080.6E ULAC 14.0N 080.7E ULAC 15.0N 080.3E	KGWC KGWC KGWC KGWC FJDG
58	140838 15	.011 /9.05				

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

3. SOUTH PACIFIC and SOUTH INDIAN OCEAN CYCLONE DATA

TROPICAL CYCLONE 01S BEST TRACK DATA

BEST TRACK	WARNING ERRORS	24 HOUR FORECE	ST 48 HOUR	FORECAST 78	HOUR FORECAST ERRORS
111118Z 10.4 69.7 45.1 11206Z 11.1 67.3 45.1 11218Z 11.6 64.6 45.1 11218Z 11.6 64.6 45.1 11218Z 12.3 57.7 35.1 11406Z 12.3 55.4 30.1 11418Z 15.0 55.4 30.1 11506Z 15.7 52.4 30.1 11518Z 16.8 51.4 625.1 11606Z 17.8 50.6 62.1 11606Z 17.8 50.6 62.1 11606Z 17.8 50.6 62.1 11606Z 17.8 64.9 9.2 25	POSIT WIND DET WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	POSIT WIND DET (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		II DST WIND POSIT	WIND DST WIND .0 e -0 . 00 e0 . 0 .
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE E AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROF AVERAGE SPEED OF TROPICAL	2. 14. 34 8 6 5 PICAL CYCLONE IS 2026. N	. 0. . 0. . 0. . 0.	TYPHOONS WHILE OVER WRNG 24-HR 48-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		

TROPICAL CYCLONE 01S FIX POSITIONS FOR CYCLONE NO. 1

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4 5 6	050600 080427 081707 090407 091647 092203	6.45 85.0E 6.15 84.8E 5.95 81.7E 6.95 81.2E 8.95 78.5E 10.15 76.6E 8.35 77.3E	PCN 55 6 PCN 5 6 PCN 5 P		EUR 1 1 30 UI 40 00 40 000 EE	PGTW KGWC KGWC KGWC FJDG
7 8 * 9 10	100041 100528 101048 101321	8.55 76.7E 10.45 74.5E 9.35 75.4E 9.65 73.3E 9.25 73.4E 9.75 72.8E	PCN 4 PCN 5 PCN 5 PCN 6 PCN 6	T2.0/2.0 /S0.0/25HRS T2.0/2.0	ULAC 10.25 073.9E	KGUC KGUC FJDG KGUC KGUC KGUC KGUC KGUC KGUC FJDG FJDG FJDG
14 15 16 17 18 19	10163301185 102302103350880 1110050330480 1111037403400 111120160004 111120160004 111120114 111120114	10.05 72.5E 9.45 72.0E 10.75 70.1E 10.45 69.9E 10.65 69.8E 11.05 68.4E	PCN 5 PCN 5 PCN 5 PCN 5	T4.0/4.0+/D2.0/24HRS T3.0/3.0 /D1.0/24HRS T2.5/2.5 /D0.1/24HRS		KGWC KGWC KGWC Fing
11001034567890	121728	11.65 68.0E 12.0S 66.5E 11.9S 66.2E 11.3S 66.4E	PCN 5 PCN 5 PCN 5 PCN 6 PCN 6	T2.5/3.5 /W1.5/24HRS T4.0/4.0		KGWC KGWC FJDG KGWC KGWC KGWC KGWC FJDG KGWC FJDG KGWC
28 29 30	122307 122308 130300 130608	11.55 63.3E 11.75 63.4E 12.05 62.7E 12.85 61.7E 11.65 61.8E	PCN 5 PCN 5 PCN 6 PCN 6	T2.5/2.5 /D1.0/24HRS T2.0/2.5 /W0.5/24HRS	ULAC 11.85 063.1E	FJDG KGWC KGWC
* 31 32 33 34	130608 131152 131152 131359 140239 140730	13.25 59.4E 13.25 58.6E	PCN 4 PCN 4 PCN 6		ULAC 11.0S 060.1E ULAC 11.9S 060.5E ULAC 13.1S 057.3E	KGWC KGWC KGWC
35 * 36 37 38	140730 141829 150709 151809	14.55 55.7E 17.55 51.0E 15.65 51.6E 17.55 51.1E	PCN 6 PCN 3	T1.5/2.0 /W0.5/25HRS T1.5/1.5 /S0.0/25HRS	ULAC 12.95 056.5E ULAC 15.15 052.6E EXP LLCC	KGWC KGWC KGWC KGWC KGWC
39 40 41	160649 161930 170629	14.55 55.7E 17.55 51.0E 17.55 51.6E 17.55 51.1E 18.35 50.8E 18.05 49.8E	PCN 3 PCN 6	T2.0/2.0 /D0.5/24HRS T0.5/1.5 /W1.5/24HRS		KGWC KGWC KGWC KGWC

TROPICAL CYCLONE 025 BEST TRACK DATA

12040182 14.4 77.2 45.15.0 1204062 14.9 75.2 50.15.3 12040182 15.7 73.5 55.15.8 1205062 16.7 72.3 55.15.8 1205182 17.5 71.1 55.17.5 1206062 18.3 70.1 45.17.5 12060182 19.0 69.0 40.19.3 1207062 19.8 67.5 30.19.9	UARNING ERRORS 2. IT UIND DST UIND POSIT 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	WIND DST WIND POSIT WIND DST W	.0 0.0 00. 0. .0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS MUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCL		TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0 0 0 0 0 0. 0 0 0 0 0. 0 0 0 0 0.	

TROPICAL CYCLONE 02S FIX POSITIONS FOR CYCLONE NO. 2

SATELLITE FIXES

					1 1	
FIX	TIME	FIX				
NO.	(2)	POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12745678901274567890127456789012745678901274567		######################################	######################################	DVORAK CODE T1.0/1.0 T1.5/1.5 T1.5/1.5 T1.5/1.5 / D0.5/24HRS T1.5/1.5 / S0.0/24HRS T1.5/1.5 / S0.0/24HRS T1.5/1.5 T2.5/2.5 / D1.0/25HRS T1.5/1.5 T2.0/2.0 T2.0/2.0 T2.0/2.5 / W0.5/24HRS T2.5/2.5 / W0.5/24HRS T1.0/1.5+/W0.5/24HRS T2.5/2.5 / D0.5/24HRS T2.5/2.5 / D0.5/24HRS T4.0/4.0+/D1.5/11HRS T3.0/3.0 / D0.5/25HRS T3.0/3.0 T3.5/3.5 / S0.0/24HRS T3.0/3.0	COMMENTS INIT OBS ULAC 06.85 089.5E INIT OBS 088.8E INIT OBS ULCC FIX ULCC FIX INIT OBS ULCC FIX ULAC 09.85 081.6E ULCC FIX ULAC 10.55 079.8E INIT OBS ULAC 10.35 081.0E ULAC 11.35 081.0E ULAC 11.35 081.9E ULAC 11.35 080.3E ULCC FIX ULAC 11.85 080.9E ULAC 11.85 081.9E ULAC 11.85 081.9E ULAC 13.85 079.7E ULAC 14.85 078.8E ULAC 13.85 079.7E ULAC 14.85 078.3E ULAC 14.05 076.2E ULAC 14.05 076.2E ULAC 14.05 076.2E ULAC 17.95 071.2E EYP LLCC ULAC 19.45 071.3E EXP LLCC ULAC 20.05 071.7E EXP LLCC	HAXXXHXXXHXXXHXHADAXXHHAXXHHAXAHAXXXXXXXX
* 43 44 45 46 47 48 49 51	041052 041018 0411318 0412318 0502153 050203 051628	73.8E 15.95 73.7E 15.45 73.5E 15.45 73.5E 17.05 73.0E 17.05 73.0E 17.05 71.9E	564624666 7777777777777777777777777777777	T2.5/2.5 /S0.0/24HRS T3.0/3.0 T3.5/3.5 /S0.0/16HRS T3.5/3.5 /D0.5/24HRS	ULAC 16.0S 073.5E INIT 0BS EXP LLCC ULAC 16.4S 073.0E EYE FIX ULAC 16.9S 073.0E	FJDG KGUC KGUC KGUC FJDG KGUC KGUC
***************************************	050237 050529 051639 051637 0606137 060509 061235 061749 070115 0701355 0717235 080610	70.9E 19.85 70.4E 18.25 70.4E 18.25 69.5E 18.25 69.0E 19.35 67.5E 19.35 67.5E 20.15 66.5E 20.15 66.3E 20.45 64.3E	00466667445444497	T2.5/2.5 /S0.0/14HRS T2.0/3.0 /W1.5/24HRS T2.0/2.5-/W0.5/11HRS T0.5/1.5 /W1.5/25HRS	EXP LLCC ULAC 19.45 071.3E EXP LLCC ULAC 20.0S 071.7E EXP LLCC	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE

TROPICAL CYCLONE 03S BEST TRACK DATA

120818Z 9.7 100.6 20 0.0 6 120906Z 10.8 102.2 25 0.0 6 120918Z 11.9 103.7 30 0.0 6 121006Z 13.0 105.1 35 12.5 10	0.0 0 -0 0 0 0 0.0 0 -0 0 0 0 0.0 0 -0 0 0 0 0.0 0 -0 0 0 0 1.8 35 35 0 13:7 1.8 45 0 0 15:5 1.3 45 24 0 22:4 1.3 45 29 5 0 0	0 0.0 00 0. 0 0.0 00 0. 1 0 0.0 00 0. 2 107. 2 55. 192. 10. 5 110. 2 65. 204. 20. 1 114. 3 55. 141. 15. 4 117. 7 30. 57. 5. 0 0.0 00 0.	48 HOUR FORECAST POSIT WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	72 HOUR FORECAST ERRORS DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CY AVERAGE SPEED OF TROPICAL CYCLOR	32. 148. 428. 19. 46. 67. 2. 13. 43. 0. 13. 43. 6. 4 2. CLONE IS 1375. NM	72-HR WPNG 0. 0. 0. 0. 0. 0. 0. 0. 0.	DONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0. 0 0 0. 0 0 0. 0 0 0. 0 0 0.	

TROPICAL CYCLONE 03S FIX POSITIONS FOR CYCLONE NO. 3

SATELLITE FIXES

FIX NO.	TIME (2)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4	080000 080300 080600 081200	7.98 97.9E 8.45 98.2E 8.75 98.2E 9.65 99.7E	PCN 6 PCN 6 PCN 6 PCN 6	T1.0/1.0	ULCC FIX INIT OBS ULCC FIX ULCC FIX	PGTW PGTW PGTW PGTW
567	081600 081800 090000	9.75 100.0E 9.65 100.1E 10.35 100.9E	PCN 6 PCN 6	T1.0/1.0	INIT OBS	PGTW PGTW PGTW
* 9 10 11 12	090300 090408 090600 090900 091200	10.65 101.8E 10.75 103.7E 10.8S 102.7E 11.4S 102.8E 11.2S 103.3E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T1.0/1.0 T1.5/1.5 /D0.5/27HRS	ULCC FIX INIT OBS ULAC 10.3S 102.8E ULCC FIX ULCC FIX ULCC FIX	PGTW KGWC PGTW PGTW PGTW
* 13 14 15	091507 091800 092100	11,35 105.1E 11.95 103.8E 12.55 104.2E	PCN 6 PCN 6	T2.0/2.0 /D1.0/24HRS	ULAC 10.75 103.8E ULCC FIX ULCC FIX	KGUĆ PGTU PGTU
17 18 19 20 * 21	100000 100348 100600 100900 100937	12.55 104.1E 12.55 105.4E 12.65 104.5E 12.65 105.2E 12.85 105.2E	PCZ Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	T2.5/2.5 /D1.0/21HRS T2.5/2.5 /D1.5/24HRS	ULAC 12.2S 105.6E ULCC FIX ULCC FIX ULAC 14.4S 105.2E	PGTW PGGTW PGGTW PGTW
23 24 25 26 27 28	101200 101447 101600 101800 102039 102100	13.55 106.4E 14.15 106.7E 13.85 106.7E 13.85 107.0E 14.05 108.0E	200566666666666666666666666666666666666	T3.0/3.0 T3.0/3.0 /D1.0/22HRS	ULCC FIX INIT OBS ULAC 13.45 106.3E ULCC FIX ULCC FIX ULCC FIX ULAC 13.2S 107.6E ULCC FIX	PGGTW KGGTW KGGTW KGGTW KGGTW PGTW
29 30 31 33 34 35	102350 110000 110328 110600 110900 110924	14.85 108.5E 14.15 107.7E 15.45 109.5E 15.75 109.2E 16.65 109.9E 16.75 109.8E	00000000000000000000000000000000000000	T3.5/3.5 /D1.0/24HRS T2.5/2.5 /S0.0/27HRS	ULCC FIX	KGUUC PGTU PGUUC KGUUC
36 37 39 40 41 42	00000000000000000000000000000000000000	16. 95 110.6E 17.85 112.5E 17.45 111.3E 18.15 112.0E 19.25 113.6E 18.95 112.9E 18.85 114.0E	PCN 6 6 6 6 9 PCN	T2.5/3.5 /W0.5/24HRS T3.0/3.0+/50.0/24HRS	ULCC FIX ULAC 13.05 105.6E ULCC FIX ULAC 13.05 105.6E ULCC FIX ULAC 13.25 107.6E ULCC FIX	PGTW KGTW PGTW PGGTW KGGTW KGWW
44 45 46 47 48	120300 120300 120307 120900 121200	19.35 113.9E 19.75 115.0E 19.45 114.8E 20.25 116.9E 20.95 117.4E 21.75 118.9E	PC	T2.5/3.5 /W1.0/24HRS	ULAC 22.05 116.9E	PGTW PGTW KGWC PGTW PGTW PGTW

SYNOPTIC FIXES

FIX	TIME	FIX	INTENSITY	NEAREST	COMMENTS
NO.	(Z)	POSITION	ESTIMATE	DATA (NM)	
1	121800	22.65 117.9E	020	130	94312 94300

TROPICAL CYCLONE 04P BEST TRACK DATA

120806Z 10 9 1 131.7 25 0 120018Z 10 9 130.5 30 0 120096Z 11.1 130.5 30 0 120096Z 11.5 133.1 2 25 0 120018Z 11.5 133.1 2 25 0 0 121006Z 11.5 133.2 2 25 0 0 121006Z 11.5 133.8 138.7 2 25 0 121108Z 13.8 138.7 2 25 14.1 121218Z 15.0 138.6 30 14.1 121218Z 15.0 138.6 30 15.1 121306Z 15.8 138.4 25 15.1 121306Z	0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	IND	ERRORS T WIND POSIT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ND POSIT WIND DST WIND 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CAVERAGE SPEED OF TROPICAL C	4 138.5 20. 25. ALL FORECAST WRNG 24-HR 35. 209. 19. 152. OR 1. 10. 1. 10. 4 2. AL CYCLONE IS 845	0. 0.0 0.0 0o	TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 04P FIX POSITIONS FOR CYCLONE NO. 4

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567	070126 070600 071406 071800 080000 080105 080300 081200	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	6666656 PPCCTTTT PPCCTTTTT	T1.0/1.0 T0.0/0.0 T1.5/1.5 /D0.5/24HRS	INIT OBS ULAC 09.25 134.7E INIT OBS ULAC 10.05 132.4E ULCC FIX ULCC FIX INIT OBS ULCC FIX ULAC 11.95 132.5E ULCC FIX ULAC 11.35 134.1E INIT OBS ULAC 12.05 134.6E ULCC FIX INIT OBS ULAC 13.35 139.1E ULCC FIX INIT OBS ULAC 12.95 139.3E ULCC FIX U	KGWC PGTW KGWC PGTW PGTW KGWC
8	081200 081600 081800	10.35 131.8E 10.35 131.5E 10.45 131.6E 10.55 131.4E	PCN 6 PCN 6 PCN 6	T2.0/2.0	INIT OBS	PGTW PGTW PGTW
11 12 13 14 * 15	0816000 08180000 08180000 09900000 09913000 09913000 1100000 1100000 1100000 1100000 1100000 1100000 1100000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 110000 11000	10.85 131.0E 10.85 130.5E 10.95 130.1E 10.85 131.1E 10.75 129.4E	9656 9656 9657 9657 9657 9657 9657	T2.5/2.5 /D1.0/24HRS T1.5/1.5 /D0.5/24HRS T1.5/2.0 /W0.5/26HRS	ULCC FIX ULAC 11.95 132.5E ULCC FIX ULCC FIX	PGTW KGWC PGTW PGTW KGWC
17 18 19	100206	11.2S 132.5E 11.1S 132.6E 11.0S 131.8F	PCN 5 PCN 6 PCN 5	T2.5/2.5 /S0.0/25HRS T2.0/2.0 /D0.5/24HRS	ULAC 11.3S 134.1E	KGWC PGTW
* 23 * 23 * 24 * 24	101306 101600 101857 102209 110000	11.15 132.8E 11.6S 131.4E 11.0S 133.1E 11.2S 133.0E 12.6S 136.1E	00000000000000000000000000000000000000	T2.0/2.0 T1.0/1.5 /W0.5/24HRS	INIT OBS ULAC 12.0S 134.6E	KGWC PGTW KGWC KGWC
26	111200	13.55 137.6E 12.95 137.0E	PCN 6		ULCC FIX	KGWC PGTW KGWC
30	111845 112148	13.85 138.2E 13.85 139.7E 14.05 139.7E	PCN 6 PCN 6 PCN 6	T2.0/2.0-/D1.0/24HRS	ULAC 14.05 140.3E	PGTW KGWC KGWC
31 32 33 34	120000 120126 120300 120846	14.25 139.6E 13.75 138.7E 14.05 139.1E 13.95 139.2E	PCN 6 PCN 6 PCN 6 PCN 6	T3.0/3.0 T2.0/2.0	INIT OBS ULAC 13.35 139.1E INIT OBS	PGTW KGWC PGTW KGWC
35 36 37 38 39	120900 121200 121225 121600 121800	13.95 139.6E 14.15 140.0E 13.85 138.2E 13.95 138.2E 14.15 138.1E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5 T1.5/2.0+/W0.5/24HRS	ULCC FIX ULCC FIX INIT OBS ULAC 12.9S 139.3E ULCC FIX	PGTW PGTW KGWC PGTW PGTW
* 40 41 * 42 43	121832 122100 122126 130000	12.65 138.0E 14.15 137.3E 14.85 135.4E	PCN 6 PCN 6 PCN 6		ULAC 12.6S 139.1E ULCC FIX EXP LLCC ULAC 12.0S 130.4E	KGUC PGTW KGUC
* 45 46	130106 130300 130600	15.35 137.5E 14.35 138.5E 16.35 138.9E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/3.0 /W0.5/24HRS T1.5/2.0 /W0.5/24HRS	ULAC 15.8S 140.8E	KGWC PGTW PGTW
* 47 * 48 49 * 50 51	130717 130825 130900 131308 140045	17.45 136.2E 15.35 135.3E 16.15 138.9E 16.85 136.8E 18.05 137.3E	PCCN PCCN PCCN PCCN PCCN PCCN PCCN PCCN		ULAC 18.45 136.5E	KGUC KGUC PGTU KGUC KGUC

TROPICAL CYCLONE 055 BEST TRACK DATA

MOZDAZHR POSIT WIND POSIT	8 55. 21. 5. 18 3 75. 13. 15. 18 5 80. 18. 10. 18 66 80. 51. 5. 18 3 70. 175. 18 8 65. 6. 0. 20 8 7 60. 21. 10.	3.5 120.2 55. 64. 5. 3.4 118.4 60. 108. 0.	48 HOUR FORECAST ERRORS D POSIT WIND DST WIND 19,7 118.0 65. 1325. 20.8 118.7 720. 2075. 18.7 113.6 75. 133. 45. 18.7 113.7 110. 253. 45. 18.7 113.7 10. 253. 35. 19.9 112.7 86. 381. 35. 19.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	72 HOUR FORECAST ERRORS ERRORS DST WIND
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYC AVERAGE SPEED OF TROPICAL CYCLONE		R 72-HR WRNG 9. 9. 9. 9. 0. 9. 0. 9.	HOONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	ec'

TROPICAL CYCLONE 55 FIX POSITIONS FOR CYCLONE NO. 5

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567890118	00000000000000000000000000000000000000	17.25 123.8E 17.75 122.6E 17.75 122.6E 17.35 121.6E 17.35 121.6E 17.55 121.0E 17.65 121.8E 17.65 121.8E	######################################	T2.0/2.0 T1.5/1.5	INIT OBS ULCC 17.45 122.4E INIT OBS ULAC 17.35 121.3E ULCC 17.75 120.9E ULAC 17.85 120.6E	######################################
14 15 16 17 18	2315200200020000000000000000000000000000	17.45 120.4E 18.05 120.6E 17.75 119.8E 17.65 119.3E 17.65 119.0E 17.55 119.0E 17.35 118.7E 17.75 118.6E	95565656254 PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP		EYE FIX	KKPKPGGGGTT
20 21 22 23 24	241200 241326 241600 241800	17.85 118.3E 17.65 118.3E 17.85 118.3E 18.05 118.1E	PCN 4 PCN 6 PCN 4 PCN 6	T3.0/3.0 T4.0/4.0	INIT OBS	KGWC PGTW PGTW KGUC
234567890+23 222222223	241925 242119 2422190 24229007 25023000 250610 250690 250810	17.65 118.1E 17.65 117.9E 17.75 117.5E 17.45 117.6E 17.45 117.6E 17.45 117.1E 17.65 117.1E	465610100544 CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	T4.0/4.0 /D1.5/24HRS T4.5/4.5 /D1.0/24HRS	EYE FIX EYE FIX EYE DIA 24NM EYE FIX	PGGTUCU PGGTUCU PGGTUCU PGGTUCU
334 335 336 339 339 40	250900 251200 2514000 2514000 2512100 25222 25223	17.85 116.9E 18.15 116.9E 17.95 117.6E 18.25 116.9E 18.25 117.1E	PCN 4 PCN 6 PCN 6 PCN 6			PGTW KGWC PGTW PGTW
399 412 423 445	251912 2523000 25230000 2600328 2600757 26009	18.15 117.2E 18.55 116.7E 18.35 117.9E 18.35 117.4E 18.75 117.9E 18.75 117.5E	00000000000000000000000000000000000000	T4.5/4.5 /S0.0/24HRS T3.5/4.0 /W0.5/25HRS	EYE DIA 18NM EYE DIA 10NM ULCC FIX EYE DIA 06NM ULCC FIX	PGTUC PGTUC PGTUC PGUC PGTUC PGUC
46 47 489 51 51 53	2609004 261034 261055 261200 261427 261800 261800 261900 262100	666882EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	14111146666664 2022222222222222222222222222222	T2.0/2.5 /W0.5/24HRS T3.5/4.5 /W1.0/24HRS	ULCC FIX ULCC FIX ULCC FIX ULCC FIX	$\begin{array}{llllllllllllllllllllllllllllllllllll$
556789 556789 61	270300 270300 270308 270600	20.55 118.2E 20.55 118.2E 20.75 118.7E 20.95 118.5E	PCN 4 PCN 5 PCN 4 PCN 5 PCN 4		EXP LLCC EXP LLCC EXP LLCC	PGTW PGTW KGWC PGTW KGWC PGTW
62 63 64	270900 271013 271200 272100	21.25 118.6E 21.65 118.9E 21.45 118.9E 21.05 120.2E	PCN 5 PCN 4 PCN 4		EXP LLCC EXP LLCC	KGWC PGTW PGTW

RADAR FIXES

FIX NO.	TIME (Z)	FIX POSITION	RADAR	ACCRY	EYE SHAPE	EYE DIAM	RADOB-CODE ASWAR TODEF	COMMENTS	RADAR POSITION	SITE UMO NO.
12345678	2340400 244000 241000 241000 2412000 2412000 2422000 2616000	17.55 119.9E 17.65 119.1E 17.65 118.5E 17.65 118.1E 17.45 117.3E 18.65 117.3E 19.35 117.5E	LAND LAND LAND LAND LAND				1/4// /2707 31111 /2705 2/8// /2704 2/// /2904 2/// /1504 1/3// /1710 1/9// //405		17.9S 122.6E 20.4S 118.6E 20.4S 118.6E 20.4S 118.6E 20.4S 118.6E 20.4S 118.6E 20.4S 118.6E 20.4S 118.6E	94203 94312 94312 94312 94312 94312 94312

SYNOPTIC FIXES

FIX TIME FIX INTENSITY NEAREST NO. (Z) POSITION ESTIMATE DATA (NM)

COMMENTS

1 240600 17.65 118.8E 060 010 94207

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 06P BEST TRACK DATA

BEST TRACK MO/DA/HR POSIT WIND F 1226122 8 4 178.6 30 0.1 1227002 8 0 180.0 40 8.1 1227122 9.7 180.5 45 9.1 1228002 11.8 181.0 45 10.1 1228122 13.1 181.9 35 11.1 1229002 12.7 182.6 25 12.7	4 179.9 40. 25. 0. 8 1 180.8 40. 405. 10 7 181.1 35. 665. 12 7 181.5 35. 87. 0. 0	24 HOUR FORECAST ERRORS POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	48 HOUR FORECAST ERRORS POSIT UIND DST UIN 0 0 0 0 0 0 0 0 0 0 0 183.9 55 235 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	D POSIT UIND DST ÜIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERRO AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICA	-i. 3. 40. 5 3 i	72-HR	OOMS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 06P FIX POSITIONS FOR CYCLONE NO. 6

SATELLITE FIXES

FIX NO.	TIME	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1204567890123456789012345 1111111111232222 ***** ***	00000000000000000000000000000000000000	8.050 1179 .98	@@@@@@@@@@############################	T1.0/1.0 T2.5/2.5 T1.5/1.5 T3.0/3.0 /D2.0/24HRS T1.5/1.5 /S0.0/24HRS T3.0/3.0 /S0.0/24HRS T0.0/1.0 /W1.5/26HRS SYNOPTIC F)	INIT OBS ULCC FIX ULCC FIX ULCC FIX ULCC FIX INIT OBS ULCC FIX INIT OBS ULAC 07.8S 179.4E ULCC FIX 07.7S 179.9E ULAC 07.8S 179.8E ULCC FIX ULAC 07.1S 180.0E ULCC FIX EXP LLCC EXP LLCC ULCC FIX ULCC FIX ULCC FIX	
				51110F110 F1	INES	

FIX NO.	TIME (Z)	FIX POSITION	INTENSITY ESTIMATE	NEAREST DATA (NM)		COMMENTS
1	261200	8.4S 178.9E	045	010	WMO 91643	
2	261800	8.8S 178.8E	035	030	WMO 91643	

TROPICAL CYCLONE 07P BEST TRACK DATA

1226067 13.8 147.8 30 0 1226187 15.2 150.5 35 0 1227067 16.6 152.8 50 16 1227187 18.4 155.3 65 18 1228062 20.3 158.1 65 15 1228187 22.1 160.9 55 28	.0 0.0 00. .0 0.0 00. .0 0.0 00. .1 152.9 45. 31. .2 154.2 50. 64	24 HOUR RS IND 9. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 15. 18.6 157.7 65. 15. 21.4 158.0 70. 5. 22.2 160.7 75. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	ERRORS D DST WIND POSIT -0. 0. 0 0 0.6 -0. 0. 0 0 0.6 -0. 0. 0 0 0.6 104. 0. 21 4 161.6 167. 15. 0 0 0.6	8 0 -C. 0. 9 0 -C. 0. 5 30. 259. 40. 9 0 -C. 0. 9 0 -C. 0.	72 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ER AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPI AVERAGE SPEED OF TROPICAL	-5. 17. CAL CYCLONE IS 132	TS	TYPHOONS WHILE WRNG 24-HR 9. 6. 9. 6. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9.	OVER 35 KTS 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 07P FIX POSITIONS FOR CYCLONE NO. 7

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1207456789011207456789011207456789011207456789011207456789011207	0000005007000608001050000000500500000001000500400 000000050004010000000000000000000000000	8.3E 8.3E 8.3E 8.3E 8.3E 8.3E 8.3E 8.3E	######################################	T1.5/1.5 T1.0/1.0 T1.5/1.5 T2.5/2.5 /D1.0/24HRS T2.5/2.5 /D1.5/24HRS T3.0/3.0 /D1.5/24HRS T3.0/3.5 /D1.0/24HRS T3.5/3.5 /D1.0/24HRS T4.0/4.0 /D1.0/24HRS T2.5/3.0 /W0.5/22HRS T3.5/3.5-/S0.0/22HRS T2.0/3.0 /W1.5/24HRS	ULCC FIX INIT OBS ULAC 13.3S 149.4E INIT OBS ULCC 15.1S 148.7E ULAC 14.1S 148.4E ULCC FIX ULCC FIX ULCC FIX ULAC 17.0S 151.6E ULCC FIX ULAC 17.2S 151.2E ULCC FIX ULAC 16.9S 151.2E ULCC FIX ULAC 17.4S 152.3E ULCC FIX	\mathbf{x}

TROPICAL CYCLONE 08P BEST TRACK DATA

1227002 12.1 166.4 25 0.0 6 1227122 13.7 167.3 30 0.0 6	1.0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	24 HOUR FORECAST ERRORS SIT WIND DST WIND 0 0 0 0 -0 0 0 0 0 0 -0 0 171.5 60 170 20 174.4 40 220 15 0 0 0 -0 0	48 HOUR FORECAS: POSIT WIND DST (0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00. 0.0 0.0 00.	
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CY AVERAGE SPEED OF TROPICAL CYCLON	23. 195. 0. 20. 167. 0. 3. 18. 0. 3. 18. 0. 4. 2. 0.	72-HR URNG 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 08P FIX POSITIONS FOR CYCLONE NO. 8

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12345678901122 *	2660900 26609000 26616000 266121345 26620145 26620145 26620145 26620000 2662121300000 2662121300000000000000000000000000000000	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	00000000000000000000000000000000000000	T1.0/1.0 T1.5/1.5 T2.0/2.0 /D2.0/24HRS	ULCC FIX INIT OBS ULCC FIX ULCC FIX INIT OBS ULCC FIX ULC	
9123456789012345	270600 270900 271044 271200 2711200 2712120 27121320 27121325 280320 2806220 2806220 2811200 2811200 2811200 2811200 2811200 2811200 2811200 2811200 2811200 2811200 2811200	13.05 167.3E 13.35 167.3E 14.95 168.6E 14.95 168.8E 14.95 168.3E 15.85 168.3E 15.55 168.8E 15.55 168.8E	76666666666666666666666666666666666666	T1.5/1.5 /S0.0/24HRS T2.5/2.5-/D0.5/24HRS	ULAC 13.4S 166.6E ULAC 14.8S 167.9E ULAC 15.0S 168.3E ULCC FIX ULCC FIX	PKPPBGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
890-1074567890-1074567890 110000000000000000000000000000000000	281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 2816000 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600 281600	17. 35 167 9E 17. 35 169 4E 17. 65 169 6E 18. 55 169 7E 17. 85 170 1E 18. 45 171 7E 18. 45 171 8E 19. 25 172 3E	066666656666 00000000000000000000000000	T3.0/3.0 T3.0/3.0 /D1.5/24HRS T3.0/3.0-/D0.5/24HRS	ULAC 17.45 168.4E ULCC FIX INIT 0BS ULCC FIX ULAC 18.95 170.3E ULCC FIX ULAC 18.65 171.6E ULCC FIX ULAC 18.85 171.5E	
378901234567 44444444	200000 900000 900000 900000 9010 9010 90	19.65 173.3E 19.85 173.3E 19.95 173.4E 20.25 173.4E 20.25 174.6E 20.15 174.6E 20.15 174.6E 20.65 175.0E 21.05 177.0E 21.05 177.0E	0000000000000464 0000000000000000000000	T3.0/3.0 T1.5/2.5 /W1.5/26HRS T2.5/3.0 /W0.5/24HRS	ULAC 19.4S 167.7E INIT OBS ULCC FIX ULCC 21.1S 174.9E ULAC 21.5S 175.4E EXP LLCC EXP LLCC	PGUSUU BERNARA

TROPICAL CYCLONE 09P BEST TRACK DATA

0110122 12.0 184.7 30 0.0 0 0 0111002 13.2 185.0 35 12.4 184 0111122 14.7 185.3 40 14.4 184 0112002 16.2 185.8 45 16.1 186 0112122 17.2 136.3 50 17.5 186 01131002 18.1 186.9 45 16.4 187 0113102 19.0 187.5 40 19.8 186	0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 1.6 35 53 0 14.4 1.8 40 34 0 16.7 1.0 40 13 -5 17.9 1.5 50 21 0 18.5 1.2 40 103 -5 17.9	0 0 0 0 -0. 0. 4 183.8 45. 158. 0. 7 184.5 45. 1085. 186.4 40. 315. 187.0 45. 41. 5. 7 189.0 30. 156. 0. 0 0.0 0 -0. 0.	48 HOUR FORECAST ERRORS 0.0 0.0 0.0 0.0 0.0 16.8 184.0 55 183 10.1 19.1 186.8 55 40.15. 18.9 188.0 35.95.5.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	72 HOUR FORECAST POSIT WIND DST WIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYCLON	54. 99. 106. 37. 62. 57. 3. 3. 10. -31. 10. 5 3	72-HR WRNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 09P FIX POSITIONS FOR CYCLONE NO. 9

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3	092015 092225 100215	11.55 177.0W 11.25 176.2W 11.95 175.5W	PCN 6	T1.5/1.5	INIT OBS ULAC 11.55 175.7W	PHNL KGWC PHNL
4 5 6 7	100924 102204 110903 111743	11.15 174.9W 12.25 175.2W 14.15 175.2W 15.55 174.6W	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5 /D1.0/24HRS	ULAC 11.65 174.2W ULAC 12.95 175.1W	KGWC KGWC KGWC KGWC
8 9 10	112144 120215 120614	15.85 174.0W 16.55 174.2W 16.85 173.9W	PCN 6	T3.5/3.5 /D1.0/24HRS		KGUC PHNL KGUC
* 12 * 13	120827 122020 122124	17.05 174.0W 16.0S 175.0W 17.6S 173.4W	PCN 4	T2.5/2.5 /W1.0/24HRS	EXP LLCC ULAC 16.05 172.8W	PHNL PHNL KGUC
14 15 * 16	130215 130553 131004	18.0S 172.7W 18.3S 172.5W 19.5S 174.1W	PCN 6 PCN 6		EXP LLCC EXP LLCC	PHNL KGWC KGWC
17 18 19 20	131833 132045 132104 140944	19.55 172.0W 19.55 171.5W 19.95 172.1W 22.35 168.2W	PCN 6 PCN 4 PCN 4	T3.0/3.0 /D0.5/21HRS T1.5/2.5 /W1.5/24HRS		KGWC PHNL KGWC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 105 BEST TRACK DATA

BEST TRACK MO/DA/HR	54.1 65. 71. 10. 22. 54.2 50. 12. 0. 20. 0. 20. 53.5 45. 165. 21. 53.1 55. 17. 0. 22. 52.6 55. 68. 0. 23. 54.6 40. 3115. 22. 55.0 55. 19. 0. 22. 55.0 56.4 5. 10. 22. 55.7 45. 26. 10. 22. 55.7 45. 26. 10. 22.	0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	48 HOUR FORECAST ERRORS 0 POSIT UIND DST UINI 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST ERRORS 0 POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CY	-0. 00. 20 18 13 L CYCLONE IS 1692. NM	72-HR WRNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	HOONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 10S FIX POSITIONS FOR CYCLONE NO. 10

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
			PCN 6	T1.0/1.0 T2.0/2.0 /D1.0/25HRS		KGWC KGWC
* 3 * 5 * 6	010111512511100102881887557172662717160656755502526132417322123167526114552511500152661527571726212232122526613224173221225266126122525555555555555555555555	055 055 055 055 055 055 055 055 055 055	######################################	T3.5/3.5 /D1.5/24HRS T3.5/3.5	INIT OBS ULAC 13.15 61.0E INIT OBS ULAC 15.45 058.4E ULAC 15.15 058.3E EYE FIX EYE FIX	KGWC KGWC KGWC
7 8 9	121441 121852 122355	15.15 58.8E 15.05 58.4E 15.7S 57.8E	PCN 6 PCN 6 PCN 6	T3.5/3.5	ULAC 15.4S 058.4E ULAC 15.1S 058.3E	KGWC KGWC KGWC
11 12 13	130321 130551 131240	15.95 57.8E 16.25 56.9E 16.8S 56.0E	PCN B PCN B PCN 2	T3.5/3.5 /S0.0/24HRS	EYE FIX EYE FIX	KGWC KGWC
14 15	131831	17.15 55.5E 18.25 55.5E	PCN 6	T4.0/4.0 /D0.5/24HRS		KGWC
16 17	140712 141058	18.65 54.9E 19.05 55.0E	PCN 6 PCN 5	T2.5/3.5 /W1.0/24HRS T3.5/3.5 /D0.5/24HRS	EXP LLCC ULAC 18.95 055.2E	KGWC FJDG
18 19 20	141358 141811 150238	19.45 54.0E 19.35 53.9E 19.85 54.1E	PCN 6 PCN 6 PCN 6		ULAC 19.55 053.3E ULAC 19.0S 053.9E	KGWC KGWC KGWC
21 22 23	150652 151047	20.05 53.7E 20.85 53.2E	PCN 5 PCN 5 PCN 6	T3.0/3.0 /D0.5/24HRS T3.5/3.5 /D0.5/24HRS	10 AC 20 05 053 0F	KGWC FJDG KGWC
25	151337 151751	20.15 53.2E 20.15 53.8E	PCN 6	T3.5/3.5 /D0.5/24HRS	ULAC 20.25 053.0E ULAC 21.05 052.7E	KGWC KGWC
27 28	160632	20.95 53.7E 22.35 53.5E	PCN 5	T3.0/3.0 /50.0/24HRS T3.0/3.0 /D0.5/24HRS	ŬĹÃČ 21.65 053.7E	KGWC FJDG
30 31	161457	22.05 54.7E 21.85 55.4E	PCN 6	T3.5/3.5 /S0.0/24HRS		KGWC KGWC
33 * 34	170611 171026	22.35 56.2E 23.05 57.1E	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	T4.5/4.5 /D1.5/24HRS T3.0/3.0 /S0.0/24HRS		KGWC FJDG
36 37	171436 171825	21.75 56.3E 22.15 56.5E	PCN 6	T4.5/4.5 /D1.0/25HRS	EVP 11.00	KGWC KGWC
39 40	180733 181015	20.95 55.4E 21.05 56.0E	PCN 5	T2.5/3.5 /W2.0/25HRS T2.5/3.5 /W2.0/25HRS	EXP LLCC ULAC 23.25 054.6E	KGWC FJDG
* 42 * 43	181415 181832 190022	21.55 54.5E 22.25 54.3E 21.85 53.7E	PCN 4 PCN 4 PCN 4		EXP LLCC ULAC 22.45 054.5E EXP LLCC EXP LLCC	KGWC KGWC KGWC
44 45 * 46	190255 190712 191306	21.55 53.5E 22.25 53.5E 22.45 51.8E	PCN 4- PCN 4 PCN 4	T2.0/2.5 /W0.5/24HRS	EXP LLCC ULAC 23,25 054.3E ULAC 22.2S 054.8E	KGWC KGWC KGWC
47 48 49	191811 200233 200652	22.05 53.2E 22.25 53.4E 23.55 53.1F	PCN 4 PCN 4 PCN 3	T2.5/2.5 /D0.5/24HRS	ULAC 23.85 054.7E	KGWC KGWC KGWC
50 51	201254 201751	24.05 52.7E 24.25 53.5E	PCN 3 PCN 3 PCN 4	T2.0/2.5 /W0.5/12HRS	ULAC 24.75 052.2E ULAC 24.55 051.8E	KĞŨČ KGUC
* 52 53	210353	24.85 54.5E 25.95 53.4E	PCN 6	T0.5/1.5 /W2.0/24HRS	ULAC 25.5\$ 52.8E	KGWC KGWC
55 56	211731	27.15 54.1E 29.0S 56.0E	9463364 PCC222 PCC222 PCC222 PCC222	T2.5/2.5 /D0.5/24HRS	ULAC 26.5S 053.7E	KGWC KGWC

SYNOPTIC FIXES

FIX NO.	TIME (Z)	FIX POSITI	он	INTENSITY ESTIMATE	NEAREST DATA (NM)		COMMENTS
1	180600	21.45	55.2E	050	025	61980	61984



	BEST TRAC	cĸ		W	ARNING				24	HOUR F	OREC			48	HOUR F				72 H	OUR F		
						ERR	ORS				F	RORS				FR	RORS				ER	RORS
MO/DA/HR	POSIT	WIND	PC	SIT	MIND		WIND	PO	SIT	MINI			P	OSIT	UINI		MIND	P05	IT	WIND	DST	WIND
011200Z	15.9 161.1	25	0.0	0.0	0.	-0.	0.	0.0	0.0	· Ø.	-0.	Ø.	0 0	0.0	0.	-0.	ø.	0.0	0.0	ø.	-0.	0.
011212Z	15 6 161 6	25	0.0	0.0	ø.	-0.	Θ.	0.0	0.0	ø.	-0.	ø.	0.0	0.0	Ø.	-0.	0.	0.0	0.0	ø.	-0.	Θ.
011300Z	15.6 162.2	25	0.0	0.0	0.	-0.	0.	0.0	0.0	ø.	-0.	Ø.	0.0	0.0	0.	-0.	0.	0.0	0.0	ø.	-0.	0.
011312Z	15.5 163.0	25	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	ø.	0.0	0.0	0.	-e.	0.	0.0	0.0	0.	-0.	0.
011400Z	15.5 163.8	30	0.0	0.0	0.	-0.	0.	0.0	0.0	ø.	-0.	Ø.	0.0	0.0	0.	-0.	ø.	0.0	0.0	0.	-0.	0.
011412Z	15.4 165.0	30	0.0	0.0	0.	-0.	0.	0.0	0.0	0.	-0.	ø.	0.0	0.0	0.	-e.	0.	0.0	0.0	0.	-0.	0.
011500Z	15.4 166 1	40	16.3	166.2		54.	5. :	18.0	169.1	65.	132.	5.	21.3	172.8		279.	-45.	0.0	0.0	0.	-0.	0.
011512Z	15.5 167.B	50	15.5	167.6		12.	5.		170.2		94.	ø.	18.9	173.6		255:	-40.	0.0	0.0	0.	-0.	0.
011600Z	15.9 169.8		15.8	169,2	55.		-5.		172.2		131.	-15.	19.8			451.	-25.	0.0	0.0	0.	-0.	0.
011612Z	16.3 171.8		16.3	171.3		29. ~			174.7	85.	190.	-15.	20.9	177.7	70.	656.	-5.	0.0	0.0	0.	~0.	0.
0117002	16.9 174.4			174.6				19.3	180.3		186.	Ø.	55 3	185.8		556.	10.	0.0	0.0	Θ.	-0.	0.
0117122	18.1 178.0		18.6	177.9				20.7	184.6		278.	-5.	23.7	191.2	55	661.	10.	0.0	0.0	0.	-0.	€.
011800Z	20.0 183.5		20.0	182.5	75.				190.5	50.	285.	-10.	27.5	198.7	35.	710.	5.	0.0	0.0	ø.	-0.	Θ.
0118122	21.9 189.4		21.8	189.0	90.	23.			194.0		,526.	30.	0.0			-0.	0.	0.0	0.0	Θ.	-0.	Θ.
011900Z	24.1 195.7		23.7	195.0	60.	45.	0. 8	29.3	206.4	30.	333.	ø.	0.0	0.0	0.	-0.	0.	0.0	0.0	ø.	-ø.	0.
011912Z	27.4 202.7		27.2	202.5	40.	16.	-5.	0.0	0.0	0.	-0.	ø.	0 0	0.0	0.	-0.	ø.	0.0	0.0	0.	-0.	0.
9129992	33 6 21A E	30 '	77 7	211 0	20	EA	a	a a	0 0		-0	•	2 2		•	0		00	0 0	a	_a	a .

AVG FORECAST POSIT ERROR 31. 239. 510. 0
AVG RIGHT ANGLE ERROR 22. 58. 145. 0
AVG INTENSITY MAGNITUDE ERROR 7. 9. 20. 0
AVG INTENSITY BIAS -2. -1. -13. 0
NUMBER OF FORECASTS 11 9 7 0

16. KNOTS

DISTANCE TRAVELED BY TROPICAL CYCLONE IS 3030. NM

AVERAGE SPEED OF TROPICAL CYCLONE IS

TYPHOONS WHILE OVER 35 KT WRNG 24-HR 48-HR 72-H 29. 228. 476. 22. 59. 148. 0. 22. 59. 148. 0. 8. 10. 23. 0. -3. -1. -16. 0.

TROPICAL CYCLONE 11P FIX POSITIONS FOR CYCLONE NO. 11

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4	110617 112326 121025	14.35 152.8E 15.45 161.3E 15.25 161.3E	PCN 5 PCN 6 PCN 6	T1.0/1.0 T2.0/2.0 /D1.0/17HRS	INIT OBS ULAC 14.6S 161.3E ULAC 15.3S 164.1E ULCC FIX INIT OBS ULAC 16.3S 163.1E	KGWC KGWC KGWC PGTW
* 567 x	121600 122100 122305	15.65 162.3E 15.55 162.3E 15.55 162.4E	PCN 6 PCN 6 PCN 6 PCN 6	T2.0/2.0 /S0.0/24HRS T1.0/1.0	ULCC FIX	PGTW PGTW KGWC PGTW
* 10 * 11	130600 131146 131600 132245	15.55 162.0E 17.25 162.8E 16.45 162.5E 15.95 163.3E	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5 T2.0/2.0 /S0.0/24HRS	ULAC 16.35 163.1E	PGTW KGWC PGTW KGWC
* 13 * 14 * 15 16	140000 140300 140713 140900	15.75 161.8E 15.85 162.1E 16.95 162.5E 14.95 163.8E		T2.0/2.0 /D1.0/24HRS	W 40 45 05 454 05	PGTW PGTW KGWC PGTW
17 18 19 20	141125 141200 141600 141642	15.85 163.9E 15.55 165.0E 15.95 165.4E 15.85 164.7E	PCN 6 PCN 6 PCN 6	T2.5/2.5 /D1.0/24HRS	ULAC 15.05 164.6E	KGWC PGTW PGTW KGWC
* 22 23 24	141800 141953 142100 150000	16.15 165.8E 14.25 167.8E 16.15 165.6E 16.25 166.2E	PCN 66 PCN 72 PCN 72	T3.0/3.0 /D1.0/24HRS T3.5/3.5 /D1.5/25HRS	ULAC 15.6S 165.7E ULAC 13.5S 167.8E	KGUC PGTU PGTU KGUC
* 26	150300 150600 150652 150900	16.55 166.7E 15.25 166.7E 14.25 167.6E 14.95 168.0E	PCN 6 PCN 6 PCN 6 PCN 6		ULCC 15.25 167.5E	PĞTÜ PĞTU KGUC PGTU
30 31 32 33	151105 151200 151630 151800	14.85 168.1E 14.75 168.5E 15.85 167.3E 15.45 168.6E	PCN 6 PCN 6 PCN 6 PCN 6	T3.5/3.5 T3.5/3.5 /D1.0/26HRS	ULCC FIX INIT OBS ULAC 15.7S 167.3E	KGWC PGTW KGWC PGTW
34 35 36 37	151932 152346 160000 160300	16.15 169.0E 15.95 169.7E 15.75 169.1E 16.05 169.8E		T3.5/3.5 /S0.0/24HRS T4.0/4.0-/D1.0/24HRS	ULCC EIX	KGWC KGWC PGTW PGTW BCTW
* 38 39 40 41	160600 160630 160900 161045	16.35 170.0E 16.45 170.6E 16.0S 170.3E 16.45 171.5E	PCZ 66	T4.5/4.5 /D1.0/24HRS	ULCC FIX ULCC FIX ULAC 17.05 169.4E ULCC FIX ULCC FIX EYE FIX EYE FIX	KGUC PGTW KGUC PGTW
43 44 4 5	161600 161617 161910	16.15 171.0E 16.45 172.8E 16.55 172.7E	PCN 6 PCN 6 PCN 6 PCN 2	T3.5/3.5 /S0.0/22HRS T5.5/5.5 /D2.0/24HRS	EYE FIX	PGTW KGWC KGWC KGWC
47 48 49 50	170000 170300 170600 170609	16.95 174.6E 17.35 175.4E 17.55 176.3E 17.55 176.1E	PCN 2 PCN 2 PCN 4 PCN 2	T5.0/5.0~/D1.0/27HRS		PGTW PGTW PGTW KGWC
51 52 * 53 * 54	765000000000000000000000000000000000000	######################################	PCN 2 PCN 6 PCN 2	T5.5/5.5 /D1.0/24HRS		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
\$56 * 57 \$58	172305 180548 180823 182104	20.25 177.0W 21.05 172.9W 21.85 171.0W 23.15 165.9W	PCC 2664466 PCC 27 PCC	T3.5/5.0 /W2.0/22HRS T2.0/3.0 /W2.0/22HRS	ULAC 21.25 172.6W ULAC 22.15 170.4W EXP LLCC	KGUC KGUC KGUC
60 61	191625	29.55 154.1W 32.35 151.6W	PCN 6		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 125 BEST TRACK DATA

MO/DA/HR POSIT WIND POI 12062 10.8 84.7 25 0.0 0112082 12.6 86.8 25 0.0 0113082 12.6 86.8 25 0.0 0113082 13.5 86.5 25 0.0 0114062 14.0 86.2 25 0.0 0114062 14.0 86.2 25 0.0 0114182 14.6 85.8 30 0.0 0115182 15.5 84.8 35 16.4 0115182 15.5 84.8 35 16.4 0116182 17.3 81.1 35 16.4 0116182 17.3 81.1 35 16.4 0117062 18.2 83.2 30 17.8 0117182 19.0 77.0 25 0.0	UARNING ERROR: SIT WIND DST WIT 0.0 00. 0 0.0 00. 0 0.0 00. 0 0.0 00. 0 0.0 00. 0 3.0 00. 0 85.1 35. 57. 0 84.0 35. 58. 0 81.0 35. 48. 0 0.0 00. 0	ND POSIT WIND DS' 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.17.1 82.9 55. 104. 17.5 81.5 45. 158. 16.6 76.1 30.153. 0.00 0.00 0.00	RRORS ERRORS I WIND POSIT WINT DST W 0.00000000000000000000000000000000000	ND POSIT UIND DST UIND 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG BIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	50. 138. 1 47. 33. 0. 13.	68-HR 72-HR 65. 0. 22. 0. 45. 0. 45. 0.	TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	

TROPICAL CYCLONE 12S FIX POSITIONS FOR CYCLONE NO. 12

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
* 1 23 4 5	140531 141600 141630 141800 142100	14.05 83.6E 13.95 85.0E 14.55 85.8E 13.88 85.4E 14.55 85.2E	PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5 /S0.0/25HRS T1.5/1.5	INIT OBS ULAC 13.25 085.7E	KGWC PGTW KGTW PGTW
* 8 9 * 10 * 11	150000 150300 150510 150600 151033 151156	1474774736665556	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.0/2.0 T2.5/2.5 /D1.0/24HRS	ULCC FIX INIT OBS ULCC FIX ULAC 13.85 086.0E ULCC 14.25 085.9E ULAC 14.85 085.7E	KGMC KGMC KGMC KGMC PGTM PGTM
12 13 14 15	151200 151609 151800 160036 160450	16.35 86.2E 15.05 85.5E 15.05 84.7E 15.05 84.0E 15.85 83.4E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 4	T2.5/2.5 /D1.0/20HRS T2.5/2.5	ULCC FIX INIT 0BS ULAC 16.2S 085.0E ULAC 17.6S 086.8E	KGWC PGTW KGWC PGTW KGWC
**	160600 160854 161020 161316 161731	16.15 83.0E 16.25 82.7E 16.45 82.6E 16.7S 81.7E 16.35 81.0E	PCN 6 PCN 5 PCN 4 PCN 6	T2.0/2.5 /W0.5/24HRS T1.5/2.0 /W0.5/27HRS T2.5/2.5 /D0.5/24HRS	EXP LLCC EXP LLCC ULAC 17.55 082.3E EXP LLCC	KGWC KGWW PGTWG KGWC KGWC KGWC
23 23 25 26	162305 170156 170430 171150 171254	18.45 80.1E 18.55 79.1E 18.75 77.5E 18.75 77.6E	PCN 4 PCN 4 PCN 4 PCN 4 PCN 4	T3.0/3.0 /D1.0/24HRS	EXP LLCC EXP LLCC	KGUC KGUC KGUC KGUC KGUC
28 29	171710 180551 190531	18.75 77.3E 20.05 75.9E 20.35 68.8E	PCN 4 PCN 4 PCN 4	T0.5/1.5 /W2.5/24HRS T0.5/0.5 /S0.0/24HRS	EXP LLCC	KGMC KGMC KGMC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 13P BEST TRACK DATA

0114127 16.5 151.9 25 0 0115002 16.6 152.9 25 0 0115122 16.3 152.9 25 0 0115122 16.3 152.4 5 30 16 16 15 16 16 16 16 16 16 16 16 16 16 16 16 16	POSIT UIND D5: 00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0. 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	RECAST	72 HOUR FORECAST ERRORS FOSIT UIND DST UIND 0.0 0.0 0. 0. 0. 0. 0. 0. 0.0 0.0 0. 0. 0. 0. 0. 0.0 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ER AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPI AVERAGE SPEED OF TROPICAL	6. 9. 11 9 CAL CYCLONE IS 24		TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 13P FIX POSITIONS FOR CYCLONE NO. 13

FIX NO.	TIME (2)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12345678900 11234567 11234 11567	131840 140000 140000 140000 140000 140000 140013 140100 1411800 1411800 1411800 1411800 1411800 1411800 1411800 1411800	16.59 151. 9EE 16.59 151. 9EE 16.59 151. 9EE 16.59 151. 9EE 16.59 151. 8EE 16.59 151. 8EE 17.29 152. 9EE 17.29 152. 9EE 17.29 152. 9EE 17.29 153. 153. 153. 153. 153. 153. 153. 153.		T1.0/1.0 T1.0/1.0 T1.0/1.0 T2.5/2.5 /D1.5/24HRS T1.5/1.5 T1.0/1.0 /S0.0/24HRS T1.0/1.0 /S0.0/24HRS T1.5/2.5 /W1.0/24HRS	INIT OBS ULCC FIX INIT OBS ULCC FIX ULCC FIX INIT OBS	KGTUS PGTUS PGTUS PGTUS PGTUS PGTUS PGTUS PGTUS RGUS PGTUS PGTUS PGTUS PGTUS PGTUS PGTUS PGTUS

18	PCN 6 PCN 73.5/3.5 PCN 6 PCN 6 PCN 73.5/3.5 PCN 6 PCN 73.5/3.5 PCN 6 PCN 73.5/3.5 PCN 7	ULCC 16.25 153.5E ULCC FIX ULAC 16.4S 154.0E ULCC FIX ULAC 15.8S 154.5E ULAC 15.8S 154.6E ULCC FIX ULAC 16.3S 158.3E ULCC FIX INIT 0BS ULCC FIX ULCC FIX ULCC FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX	BCBCBCCCBBBCCCCBBCCCCBCCCCBCCCCBCCCCCBCCCC
38 170000 15.8S 161.5E 39 170300 15.8S 162.5E 40 170600 15.7S 163.0E 41 171025 15.4S 163.9E 42 171200 15.5S 164.5E	PCN 2 PCN 2 T4.0/4.0 /D1.5/27HRS PCN 2 PCN 2 T5.0/5.0 /D1.5/24HRS PCN 2	EYE FIX EYE FIX	PGTU PGTU PGTU KGUU KGUU KGUU KGUU KGUU
47 172305 15 75 167.5E 48 180000 15 65 167.9E 49 180300 15 75 168.5E 50 180600 15 85 169.4E 51 180729 15 85 170.1E	PČN 2 T4.5/4.5 /D0.5/24HRS PCN 2 T4.5/4.5 /D0.5/24HRS PCN 2 PCN 2 PCN 2	EYE FIX EYE FIX EYE FIX	PGTW KGWC PGTW PGTW PGTW KGWC

TROPICAL CYCLONE 14P BEST TRACK DATA

BEST TRACK MO/DA/HR POSIT WIND POSIT 011618Z 14.8 146.3 25 0.0 0.6 011706Z 14.8 149.0 45 14.8 148.6 011718Z 14.8 151.8 65 14.8 151.8 011806Z 15.5 154.4 80 15.4 154.6 011818Z 16.0 156.3 90 16.0 156.3 011906Z 16.2 158.4 100 16.4 158.6 011918Z 16.6 158.4 100 16.4 158.6 011918Z 16.6 161.4 90 16.5 161.3 012006Z 17.0 164.8 75 17.3 165.6 012018Z 18.3 168.4 55 18.1 168.6 012108Z 21.0 171.7 40 26.6 17.6 012118Z 21.3 174.4 25 22.9 176.5	0 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	157.8 95. 99. 5. 1 160.6 105. 132. 5. 1 161.0 115. 38. 25. 1 162.9 115. 119. 40. 6	48 HOUR FORECAST ERRORS 0.0 0.0 0.0 0.0 0.0 0.1 10 10 10 10 10 10 10 10 10 10 10 10 10	72 HOUR FORECAST POSIT UIND DEFRORS 0.0 0.0 0.0 -0.0 0.0 0.0 0.0 0.0 -0.0 0.0 0.0 0.0 0.0 -0.0 0.0 0.0 0.0 0.0 -0.0 0.0 0.0 0.0 0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYCLONE AVERAGE SPEED OF TROPICAL CYCLONE	28. 98. 120. 14. 42. 55. 4. 18. 37. 2. 15. 33. 10 8 6	Z-HR URNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0. 0 0 0. 0 0 0. 0 0 0. 0 0 0.	

TROPICAL CYCLONE 14P FIX POSITIONS FOR CYCLONE NO. 14

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567	15116000 151189000 151189000 15706000 17006440 17707200 17707200 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 1771720 17717	######################################		T1.5/1.5	INIT OBS ULCC FIX INIT OBS ULAC 14.6 149.0E INIT OBS EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX EYE FIX	######################################
7 8 9	170300 170600 170644	14.85 148.0E 14.85 149.1E	PCN 6 PCN 2	T3.0/3.0	INIT OBS	PGTW PGTW
10	170750 171200	15.25 149.6E 14.85 150.6E	PCN 5 PCN 6	T2.5/2.5 /D1.0/12HRS	ULAC 14.6 149.0E	KGWC PGTW
12	171206 171747	13.95 150 6E 14.85 151 9E	PCN 6 PCN 1	T3.0/3.0	INIT OBS EYE FIX	KGWC KGWC
14 15	171800	14.85 151.7E 15.05 152.4E	PCN 2 PCN 2 PCN 2 PCN 2	T4.0/4.0	INIT OBS EYE FIX EYE FIX	PGTW KGWC
1274567890123745678901237556	180000 180047	15.0S 153.1E 15.1S 152.9E	PCN 2 PCN 1	T4.5/4.5 /D1.5/21HRS T4.5/4.5 /D2.0/20HRS	EYE FIX	PGTW PGTW KGWC
20	180600 180729	15.55 154.4E 15.75 154.4E			EYE FIX	PGTW KGWC
23	1811204 188112004 1881120000 18811200000 18811200000 1900000 19000000 19000000	15.85 155.1E 15.85 155.3E	PCN 2 PCN 2	T4.5/4.5 /D1.5/24HRS	EYE FIX EYE FIX EYE FIX	KGWC PGTW
26 27	181734 181800	16.05 155.9E 16.05 156.4E 15.05 156.3E	PCN 2 PCN 2	T5.0/5.0 /D1.0/24HRS	EYE FIX	PGTW KGWC PGTU
29 28	182009 182160	16.15 156.5E 16.15 156.7E	PCN 2 PCN 2		EYE FIX	KGWC PGTW
30 31 32	190000	16.25 157.2E 16.15 157.3E	PCN 4 PCN 1 PCN 4	T5.5/5.5 /D1.0/24HRS T5.5/5.5 /D1.0/24HRS	EYE FIX	PGTW KGWC
33 34	190600 190708	16.25 158.3E 15.95 158.5E	PCN 22 PCN 22 PCN 22 PCN 22 PCN 2		EYE FIX EYE FIX	KGWC PGTW PGTW KGWC PGTW
35 36 37	190900 191126 191200	16.35 159.0E 16.35 159.5E	PCN 2	T5.0/5.0 /D0.5/24HRS	EYE FIX	PĞTÜ KGWC PGTU
3/	191500	10.33 159.76	FUN 2		FAF LTX	PGTU

38 39 40 41	191721 1 191800 1 191948 1	16.55 161.0E 16.95 161.8E 16.75 161.4E 16.85 162.4E	PCN 2 PCN 4 PCN 4 PCN 4	T4.5/5.0 /W0.5/24HRS		PGTW KGWC PGTW KGWC
423 44 45 46	200000 1 200006 1 200300 1	16.75 162.6E 17.45 163.8E 17.15 163.8E 17.05 164.8E 16.95 164.9E	PCN 4 PCN 6 PCN 4 PCN 4 PCN 4	T3.5/4.5 /W2.0/24HRS	ULAC 17.85 163.8E EXF LLCC EXP LLCC	PGTW PGTW KGWC PGTW PGTW
47 48 49	200647 1 200900 1 201105 1	17.25 165.0E 17.05 165.4E 17.55 166.1E 17.25 166.3E	PCN 6 PCN 6 PCN 6 PCN 6	T3.5/4.5 /W1.5/24HRS	ULAC 13.55 165.8E	KGWC PGTW KGWC PGTW
50 51 52 53 * 54	201600 1 201709 1 201927 1	7.95 167.3E [8.35 168.4E [8.65 170.0E [9.45 172.7E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/3.5+/W2.0/22HRS		PGTW KGWC KGWC KGWC
55 56 57	210000 1 210300 3 210600 3	19.75 170.2E 20.2S 171.3E 20.5S 172.3E	PCN 6 PCN 6 PCN 6	T2,5/3.5 /W1.0/24HRS T1.5/2.5 /W2.0/24HRS		PĠTŴ PĠTW PĠTW
58 59 60	210900 2	20.05 171.6E 20.95 173.2E 20.55 172.2E	PCN 4 PCN 6 PCN 4		EXP LLCC EXP LLCC	KGWC PGTW KGWC
* 61 62	211800 8 211905 8	23.05 176.0E 21.05 174.3E	PCN 6 PCN 4	T0.0/0.5 /W2.5/26HRS	EXP LLCC	PGTW KGWC
63 64 65	220000	21.65 175.2E 21.75 176.0E 21.95 176.1E	PCN 4 PCN 6 PCN 4	T0.5/1.5 /W2.0/24HRS T0.5/1.0 /W1.0/24HRS	EXP LLCC EXP LLCC	KGWC PGTW PGTW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 155 BEST TRACK DATA

0131122 25.4 60.7 35 25.6 60	0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	24 HOUR FORECAST SSIT WIND DST WIND 0 0 0 -0 0 0 0 0 -0 0 65.2 55. 6310. 65.2 55. 6310. 65.2 65. 585. 64.2 65. 935. 64.9 65. 82. 0 64.9 65. 82. 0 64.9 65. 33. 10. 64.0 65. 33. 10. 60.4 40. 187. 5 59.4 30. 322. 0 0 0 0 -0 0	48 HOUR FORECAST POSIT WIND ERRORS 0 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 -0 0 0 19 4 63.5 70 25.15 19 1 62.3 70 84 15. 23 3 64.9 55. 245. 10 24 7 64.9 55. 245. 10 25 5 60.6 45. 212. 15 0 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST POSIT UIND DST UIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0					
AUG FORECAST POSIT ERROR 24-HR 48-HR 72-HR WRNG 24-HR 48-HR 72-HR AVG FORECAST POSIT ERROR 28. 122. 145. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.									

TROPICAL CYCLONE 155
FIX POSITIONS FOR CYCLONE NO. 15

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4	251751 260632 261138 261306 261731	11 98 68 8E E E 13 45 66 67 4E E 14 405 66 67 4E E 14 55 66 67 62 E E E 16 62 62 E E E 16 62 62 62 E E E 16 62 62 62 62 62 62 62 62 62 62 62 62 62	PCN 6 PCN 5 PCN 6 PCN 6	T1.0/1.0 T2.5/2.5 /D1.5/24HRS	INIT OBS ULAC 13.95 068.1E ULAC 14.05 067.8E ULAC 15.25 068.2E ULAC 15.95 067.5E	KGWC KGWC KGWC
* 6 * 7	26106120 61060261 77112061 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 77117100 771100 77117100 77117100 77117100 77117100 77117100 77117100 77117	66.8E 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	######################################	T3.0/3.0 /D0.5/24HRS T2.5/2.5 /D1.0/24HRS		AAXXZXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
9 10 11	271711 280010 280306	16.15 65.6E 16.6S 66.2E 16.45 65.9E	PCN 6 PCN 6 PCN 6	T3.5/3.5	INIT OBS ULAC 15.9S 065.2E ULAC 16.5S 065.5E	KGWC KGWC
11 12 * 13 14 15	280551 281009 281113 281405	16.35 65.8E 16.55 64.6E 16.75 66.5E	PCN 6 PCN 6 PCN 4	T3.5/3.5 /D0.5/24HRS T3.5/3.5 /D0.5/24HRS	ULAC 16.5S 065.3E	KGWC FJDG KGWC KGWC
16 17 18	281605 282358 290245	17.85 66.1E 18.15 66.0E 18.45 65.6E	PCN 6 PCN 4 PCN 6	T4.5/4.5 /D1.0/24HRS	ULAC 19.05 064.3E ULAC 19.45 064.8E	KGWC KGWC KGWC
19 20 21	290531 290958 291243	18.55 64.7E 19.45 65.0E 19.45 63.7E	6466566666 PPCCTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	T3.0/3.5 /W0.5/24HRS T4.0/4.0 /D0.5/24HRS	ULAC 19.45 064.8E	FJDG KGUC
23 24 25	291343 291812 292345 300223	19.65 63.6E 19.65 63.5E 20.65 63.4E	PCN 6 PCN 6 PCN 6	T4.5/4.5 /S0.0/25HRS		KGWC KGWC KGWC
26 27 28	25451835451839055541352841352852905353545532558355835583558355835583558355835583	20.05 62.6E 20.15 62.7E 21.15 61.2E	PCN 6 PCN 5 PCN 6 PCN 4	T3.0/3.5 /S0.0/25HRS T2.5/3.5 /W1.0/24HRS	ŬLAC 21.25 063.0E Ulac 20.15 062.7E Exp llcc Ulac 23.45 062.6E	KGWC KGWC KGWC
.678901234567890123456 1111222222222222222222222222222222222	310632	22 75 60 85	PCN 4 PCN 4 PCN 3	T1.0/2.0 /W2.0/24HRS	ULAC 20.5S 062.9E ULAC 21.2S 063.0E ULAC 20.1S 062.7E EXP LLCC ULAC 23.4S 062.6E EXP LLCC EXP LLCC EXP LLCC EXP LLCC ULAC 23.4S 062.6E EXP LLCC EXP LLCC ULAC 27.8S 061.7E EXP LLCC ULAC 31.7S 066.1E ULAC 36.0S 070.4E	KGWC KGWC KGWC NPOC
33 34 35	311100 311731 010612 011711 020552	23.75 60.8E 26.05 62.8E 26.95 61.0E 30.75 63.9E 34.45 67.0E 36.25 74.5E	PCN 3 PCN 4 PCN 5	T1.5/1.5 /D0.5/24HRS	ULAC 27 8S 061.7E EXP LLCC ULAC 31.7S 066.1E ULAC 36.05 070.4E	KGUC KGUC KGUC
36	020552	36.25 74.5E	PCN 6	T0.0/1.0 /W1.5/24HRS		KGWC



0124122 15.0 203.4 25 0.0 012502 15.9 200.7 30 0.0 0125122 16.8 201.7 30 0.0 0126022 17.7 200.3 35 0.0 0126022 19.4 198.4 35 0.0 012702 20.7 196.3 35 0.0 012702 20.7 196.3 35 0.0 0127122 22.1 194.1 45 0.0 0127122 22.1 194.1 45 0.0 012802 23.8 191.7 62 33.4 0128122 25.8 189.2 75 25.8 0128020 28.5 187.6 75 28.5 0128122 30.9 187.8 65 30.8 0130002 34.2 192.1 50 34.7	0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 192.3 55. 415. 29.0 1 189.2 60. 015. 34.7 1 188.0 65. 2110. 32.9 1	ERRORS	0 00. 0. 0.0 0 0 -0. 0. 0.0 0 0 -0. 0. 0.0 0 0 -0. 0. 0.0 0 0 -0. 0. 0. 0.0 0 0 -0. 0. 0.0 0 0 -0. 0. 0.0 0 70 226. 20 0.0 8 30 4935. 0.0 0 0 -0. 0. 0.0 0 0 -0. 0. 0.0	0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYC	42. 187. 359. 23. 71. 305. 3 9. 9. 1384. 8. 6 4 2.		E OVER 35 KTS 48-HR 72-HR 355. 0: 305. 0: 13. 0: 8. 0: 2 0:	

HURRICANE 16P FIX POSITIONS FOR CYCLONE NO. 16

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567890112345678901123456 *	2440394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 24204394 242043 242043 242043 242043 242043 242043 242043 242043 242043 242043 24204 242043 242043 2420	1457.8999.8059.8059.8059.8059.8059.8059.8059	PECHNOL REPORT R	T1.0/1.0 T2.0/2.0 /D1.0/24HRS T2.5/2.5 /D0.5/24HRS T2.5/2.5 /D0.5/24HRS T2.0/2.5 /J0.5/24HRS T3.5/3.5 /D1.5/24HRS T3.5/3.5 /D1.5/24HRS T4.5/4.5 /D2.0/47HRS T3.0/4.0 /W0.5/25HRS T3.5/4.0 /W1.0/24HRS T3.0/4.0 /S0.0/24HRS T1.5/2.5 /W1.5/24HRS	INIT OBS ULAC 12.5S 156.9W ULAC 14.5S 157.0W ULAC 17.9S 160.2W ULAC 18.2S 161.5W ULAC 20.5S 162.5W EYE FIX ULAC 35.0S 167.6W ULAC 35.0S 163.8W ULAC 35.4S 162.1W	SASSASSASSASSASSASSASSASSASSASSASSASSAS

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 175 BEST TRACK DATA

BEST TRACK MO/DA/HR POSIT 0123902 18.1 120.6 25 0.0 0123902 18.3 119.1 35 0.0 013002 18.3 119.1 35 0.0 013002 18.5 118.0 45 18.3 013012 28.5 117.1 55 18.4 013102 20.3 117.0 45 26.0 0131122 22.3 116.9 35 22.2	116.8 50. 185. 116.5 50. 33. 5.	0.0 0.0 0. 19.3 115.5 45.	ERRORS	00. 0, 00. 0. 00. 0. 00. 0.	72 HOUR FORECAST ERRORS 0 FOSIT WIND DST WIND 0 0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGH, ANGLE ERROR AVG INTENSITY MIGNITUDE ERROF AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL	1. 10. 0	. 0. . 0. . 0.	TYPHOONS WHILE WRNG 24-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	OYER 35 KTS 48-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0.	
AVERAGE SPEED OF TROPICAL CYC					

TROPICAL CYCLONE 17S FIX POSITIONS FOR CYCLONE NO. 17

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX FOSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
10345678901034567	2907371 2907371 2907371 2907371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 2007371 200737	18.25 120.0E 18.75 119.5E 18.75 119.5E 18.75 118.5E 17.75 118.5E 18.45 117.3E 20.85 117.3E 18.45 117.3E 20.15 117.1E 20.15 117.1E 20.15 117.1E 20.25 116.7E 20.25 116.7E	55566514446611764 PPCCNNCNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	T1.5/1.5 T3.5/3.5 /D2.0/24HRS T4.0/4.0 T3.5/3.5	INIT OBS ULAC 17.85 118.1E ULAC 18.45 117.5E ULAC 18.95 118.5E ULAC 18.05 118.2E INIT OBS RGD EYE RGD EYE RGD EYE INIT OBS EYE DIA .6 NM	X4XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 18P BEST TRACK DATA

MO/DA/HR POSIT UIND 0202002 11.6 156.7 39 0.0 0202122 13.5 156.0 0.35 12.0 0202122 14.5 156.0 0.35 12.0 0202122 14.5 156.0 0.35 12.0 0202122 14.5 156.0 13.5 14.0 0204122 14.5 156.0 13.5 14.0 0204122 13.5 1447.5 35 13.0 0205122 13.5 1441.6 35 13.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.7 143.5 25 14.0 0205122 14.0 0205122 14.0 0205122 14.0 02051	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S POSIT WIN P POSIT WIND P POSIT WIN P P P P P P P P P P P P P P P P P P P	ERRORS ND DST WIND POSIT 109. 25. 14.8 156 97. 10.16.0 145 146. 15. 16.8 147 146. 15. 16.8 147 146. 5. 10.0 66 158. 5. 0.0 66 1270. 25. 0.0 66	0.0 00. 0. 0.2 75. 178. 40. 0.5 50. 258. 15. 7.0 50. 249. 15.	72 HOUR FORECAST ERRORS POSIT UIND DST WIND 0.0 0.0 00. 0. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE FROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPIC AVERAGE SPEED OF TROPICAL C	50. 146. 2 32. 124. 1 30. 13. 14. 2. 13. 9 7	8-HR 72-HR 19. 0. 42. 0. 19. 0. 19. 0.	TYPHOONS WHI URNG 24-HF 0 0 0 0 0 0 0 0 0 0 0	LLE OVER 35 KTS 2 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 18P FIX POSITIONS FOR CYCLONE NO. 18

FIX NO.	TIME (2)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12345678501234567850123456785012345678501 111111111112222222222222222222222222	00000004000000000000000000000000000000	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	PCN 6 PCN 4 PCN 6	T2.5/2.5 /D1.5/25HRS T2.0/2.0 /W1.0/24HRS T2.5/2.5 T2.5/2.5 T2.0/2.0	INIT OBS ULAC 13.2S 160.2E INIT OBS ULAC 13.4S 156.2E ULAC 14.2S 155.5E ULAC 14.2S 154.7E ULAC 13.7S 155.0E ULAC 14.2S 154.4E INIT OBS ULAC 14.0S 153.2E INIT OBS ULAC 13.4S 152.8E INIT OBS ULCC FIX ULAC 13.0S 150.1E ULCC FIX ULAC 14.0S 151.1E ULAC 12.9S 151.5E INIT OBS ULAC 12.9S 151.5E ULAC 13.4S 149.7E ULAC 13.4S 147.5E ULCC FIX	PROBLEMENT OF THE PROPERTY OF THE PROBLEMENT OF

42 43 44 45 46 47	051227 051600 051800 051853 052032 060000	13.05 144.5E 13.45 144.1E 13.25 143.7E 12.85 143.7E 13.15 144.0E 13.35 143.7E	7 6 6 6 6 PCN	T1.5/1.5	INIT OBS ULCC FIX ULCC FIX ULAC 13.55 143.6E ULAC 13.05 143.7E	KGWC PGTW PGTW KGWC FGTW
* 48 49 50 * 51	060108 060300 060600 060738 060900	14.85 140.9E 14.15 143.6E 14.75 143.5E 15.15 140.3E 14.65 143.5E	PCN 5 PCN 6 PCN 6 PCN 5 PCN 6	T1.5/1.5	INIT OBS	KĞÜĞ PGTW PGTW KGWC PGTW
* 53 554 556 567 58	060912 061200 061207 061841 062011	15.25 145.3E 14.85 143.2E 14.85 144.2E 14.95 145.1E 15.25 145.3E	PCN 6 PCN 6 PCN 6 PCN 5		EXP LLCC ULAC 14.2S 137.6E ULAC 15.1S 145.7E ULAC 15.3S 146.0E	KGWC PGTW KGWC KGWC KGWC
58 59 60 61 62	070047 071147 080027 080600 081126	14.85 145.8E 15.45 145.8E 14.55 149.1E 14.05 148.8E 1J.85 149.2E	PCN 5 PCN 5 PCN 5 PCN 6 PCN 6	T1.0/1.0 /50.0/24HRS	ULAC 15.35 148.8E ULAC 14.0S 149.5E ULCC FIX	KGUC KGUC KGUC PGTW KGWC
63 64 65 66	090007 090300 091106 092342	15.03 152.6E 14.7S 149.8E 15.5S 156.0E 16.1S 152.7E	PCN 5 PCN 6 PCN 5 PCN 5	T1.5/1.5 /D0.5/24HRS T1.5/1.5 T0.5/1.5 /U1.0/24HRS	ULAC 14.3S 151.7E INIT OBS	KGWC PGTW KGWC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPPESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 195 BEST TRACK DATA

02005182 13.4 68.9 35 13 02006182 14.4 67.4 30 13 02006182 14.4 65.4 9 30 13 02006182 16.4 65.9 30 15 15 0200782 16.5 63.9 25 15 0200782 16.5 63.9 25 35 15 0200782 16.5 63.9 25 35 15 0200782 16.5 65.4 4 50 16 0200782 16.7 53.4 50 17 0201082 16.7 53.4 50 17 0201082 16.7 53.4 50 18 0210182 19.1 45.8 26 19	.9 66.5 40. 60. 10. 15. 18. 5 64.4 35. 46. 10. 16. 6. 62. 3 30. 125. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	3 61.5 45. 131. 15. 88 62.5 25. 288 -10. 0. 0 0.0 0 -0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	48 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST ERRORS UIND DST UIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MIGNITUDE ERI AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL (3. 11. 20. 10 8 5 CHL CYCLONE IS 1612. NM	72-HR URNG 0. 0. 0. 0. 0. 0. 0. 0.	000NS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 195 FIX POSITIONS FOR CYCLONE NO. 19

FIX NO.	TIME (2)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567	041752 050157 050632 051114 051256 051731 052359	13.25 68.8E 13.65 68.7E 12.85 70.1E 12.55 69.3E 12.95 69.1E 13.45 67.3E	6634446 PCCCXX PCCXXX PCCXX PCCX	T1.5/1.5 T2.0/2.0 /D0.5/12HRS	EXP LLCC EXP LLCC	KGUC KGUC KGUC KGUC KGUC KGUC
* 9 * 10 * 11 12 13 14 15	060612 061014 061102 061416 061711 062346 070258	155.55 144.55 155.47 155.55 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 167.06 16	2222222 22222222 244444 24444 2444 244	T1.5/1.5 /S0.0/24HRS T2.5/2.5 /D1.0/24HRS	EXP LLCC	AAAHXAAAHXAAAAAAHAAAAAHXAAAAHXAAXAAAAAAA
* 16 17 18 19 10 10 10	070552 071003 071231 071355 071832 080213 081812	14.35.95 60.06EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	00000000000000000000000000000000000000	T1.5/1.5 /S0.0/24HRS T2.5/2.5 /S0.0/24HRS T2.5/2.5 /D1.0/25HRS T3.0/3.0	EXP LLCC EXP LLCC ULAC 15.0S 059.5E EXP LLCC ULAC 15.1S 058.4E ULAC 16.0S 056.9E ULAC 16.3S 055.7E INIT OBS ULAC 16.1S 052.0E	KGUC KGUC KGUC KGUC KGUC
**** **** *	090103 090355 090653 091123 091206 091453	71000 M M M M M M M M M M M M M M M M M M	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	†3.5/3.5 /D1.0/24HRS		KGUC KGUC FJDC KGUC KGUC
* 30 31 * 32 33 34 35 36	100334 100632 101113 101335 101425 101913 110753	17.85 50.3E 19.15 47.8E 17.75 45.0E 19.45 46.2E 19.65 45.7E 19.15 44.9E 19.45 43.9E	222222 222222 222222 22222 22222 2222 2222	T0.5/0.5+	ULAC 16.0S 050.1E INIT OBS	KGUC KGUC FJDG KGUC KGUC KGUC

SYNOPTIC FIXES

FIX	TIME	FIX	INTENSITY	NEARÉST	COMMENTS
NO.	(Z)	POSITION	ESTIMATE	DATA (NM)	
1	081800	16.85 55	5.0E 035	090	61976 61995 SHIP
2	090000		5.3E 040	070	61976 61995 61984
3	090630		5.8E 035	080	61976 61995 61984

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 20S BEST TRACK DATA

## DEST TRACK MO/DA/HR POSIT	0.0 0 -0.0 0 122.2 35. 23. 0 120.7 45. 18. 0 117.6 55. 21. 0 114.6 55. 6. 0 107.5 65. 25. 10. 103. 8 60. 13. 10. 103. 8 60. 13. 10. 103. 103. 103. 103. 103. 103.	D POSIT WIND DST	IND POSIT WINT DST 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	ST 72 HOUR FORECAST ERRORS UIND POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERRO AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICA AVERAGE SPEED OF TROPICAL CY	24. 142. 37 17. 89. 22 R 4. 10. 1 3. 6. 1 11 10	:-HR 72-HR UF '5. 0.	YPHOONS WHILE OVER 35 KTS NG 24-HR 43-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 205 FIX POSITIONS FOR CYCLONE NO. 20

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
NO.	(Z)	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE			ULCC 14.4S 126.2E EXP LLCC ULCC FIX EXP LLCC ULCC 13.9S 125.6E ULCC 13.9S 125.2E ULAC 13.9S 123.6E INIT 0BS ULAC 13.6S 124.3E ULAC 12.8S 123.4E INIT 0BS ULAC 13.7S 122.2E INIT 0BS ULAC 15.5S 122.5E ULAC 15.9S 122.5E INIT 0BS ULCC 15.5S 121.1E ULAC 15.3S 121.0E ULAC 15.3S 119.9E ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX ULCC FIX	AN ALANA BANA BANA BANA BANA BANA BANA B
52 53 54	141200 141429 142024 150000	18.85 108.5E 18.95 107.1E 19.15 105.4E	PCN 6 PCN 6 PCN 6	T4.0/4.0 /D1.0/24HRS		KGUC KGUC PGTW

55678901 55555566	150006 150300 150310 1506837 1500900 150908	19.35 105.7E 19.25 104.4E 19.55 104.8E 19.45 103.6E 21.05 101.7E 19.75 103.2E	00000000000000000000000000000000000000	T3.0/3.0 /S0.0/24HRS T3.5/3.5 /S0.0/24HRS T1.5/1.5	INIT OBS	KGWC PGTW KGWC PGTW PGTW KGWC PGTW
* 62 63 * 64 * 65	151200 151550 151600 151800	20.05 103.2E 20.55 100.5E 20.55 102.0E 20.25 101.7E	PON 6 PON 6 PON 6	T2.5/3.5 /W1.5/25HR\$ T1.5/1.5	INIT OBS	KGWC PGTW PGTW KGWC
* 66 67	152011 152153	21.15 100.0E 19:55 98.4E 18:85 97.9E	PCN 6 PCN 6 PCN 4		EXP LLCC EXP LLCC	KGWC KGWC
68 69 70	152315 160300 160431	18.75 97.0E 18.65 96.8E	PCN 4	T2.0/3.0 /W1.0/24HRS T0.0/1.0 /W2.5/25HRS	EXP LLCC	PGTW KGWC PGTW
71 72	160600 160819	18.55 96.1E 18.55 95.5E	PCN 4 PCN 5 PCN 6	T1.0/1.5 /W0.5/24HRS		FJDG PGTW
73 74 7 5	160900 161038 161200	18.45 95.2E 18.55 94.5E 18.45 94.8E	PCN 4 PCN 6		EXP LLCC Exp LLCC	KGWC PGTW
76 77	161225 161530	18.45 95.0E 18.35 93.8E	PCN 4 PCN 4	m. F.4 F	EXP LLCC EXP LLCC INIT OBS EXP LLCC	KGWC KGWC PGTW
78 79 80	161600 162140 170105	18.35 93.7E 18.55 93.0E 18.65 92.0E	PCN 4 PCN 4 PCN 4	T1.5/1.5	EXP LLCC EXP LLCC	KGWC KGWC
81 82 83 84	170300 170411 170600 170815	18.95 91.1E 18.35 91.2E 19.15 90.4E 18.55 90.4E	PCN 6 PCN 6 PCN 5	T1.5/1.5 /D1.5/24HRS T0.5/1.0 /W1.5/24HRS T0.5/1.0 /W0.5/24HRS	EXP LLCC	PGTW KGWC PGTW FJDG KGWC
85 86 87	171510 180350 180947	19.85 89.4E 18.75 86.6E 19.25 84.9E	PCN 6 PCN 6 PCN 5	T0.0/1.0 /W1.5/24HRS T0.0/0.5 /D0.5/24HRS	EXP LLCC	KGWC FJDG

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 215 BEST TRACK DATA

0214022 15.0 44.1 25 0 0214022 15.0 45.1 35 0 0 0214022 15.0 45.1 35 0 0 0214022 15.0 45.1 35 0 0 0215002 14.9 46.2 40 14.0 02151022 12.5 45.5 55.0 12.0 0216002 12.2 46.0 14.0 12.0 0216002 12.2 12.1 46.0 14.0 12.0 0216002 12.2 12.5 47.5 35.5 12.0 0216002 12.5 47.5 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 47.8 35.5 12.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 12.5 48.0 0218002 1	0 0 0 0 - 0 0 0 0 0 1 0 0 0 0 1 0 45.8 40 18 46.8 40 45 46.3 40 45 46.1 45 45 13 47.5 40 45 13 47.5 35 5 13 48.3 35 36	ERRORS DST WIND POSIT 0. 0. 0. 0.0 0. 0. 0.0 0.0 8. 0. 14.9 46.7 16. 0. 14.6 48.5 145. 14.1 46.3	30. 20920. 40. 1155. 1 45. 179. 5. 1 45. 166. 10. 1	0.0 0.0 0. 13.8 47.0 40. 10.2 43.2 45. 10.0 44.7 45.	ERRORS	0.0 00. 0. 0.0 00. 0. 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPIC AVERAGE SPEED OF TROPICAL C	WRNG 24 33. 14 19. 6 08. 4. 0. 10 AL CYCLONE IS	RECASTS 4-HR 48-HR 72-HR 45. 220. 0. 55. 129. 0. 9. 12. 0. 2. 8. 0. 8. 5. 0. 511. NM	TYPHOURING	OONS WHILE OVER 24-HR 48-HR 0 0 0. 0 0. 0 0. 0 0. 0 0. 0 0.	35 KTS 72-HR 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 21S BEST TRACK DATA

0215062 13.9 45.9 45 0 0215182 13.1 45.5 50 0	UARNING	24 HOUR FORECAST ERROR: POSIT WIND DST WI1 14.6 48.1 30.13515 0.0 0.0 00. 0 0.0 0.0 00. 0 0.0 0.0 00. 0 0.0 0.0 00. 0 0.0 0.0 00. 0	#D POSIT WINI 0.0 0.0 0. 0.0 0.0 0. 0.0 0.0 0.	ERRORS D DST WIND PO -0. 0. 0.0 -0. 0. 0.0 -0. 0. 0.0	72 HOUR FORECAST ERRORS SIT WIND DST WIND 0.0 00. 0. 0.0 00. 0. 0.0 00. 0. 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ER AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPI	ALL FORECASTS URNG 24-HR 48- 37. 135. 08 5. 105. 08 ROR 0. 15. 0 0 -15. 0 1 1 0 CAL CYCLONE IS 194. N	HR 72-HR URN . 9. 9. 9 9. 9. 9 9. 9. 9.	. 0. 0. 0. 0. . 0. 0.	35 KTS 72-HR 0. 0. 0. 0.	

TROPICAL CYCLONE 21S FIX POSITIONS FOR CYCLONE NO. 21

FIX NO.	TIME (Z)	FIX POSITI		ACCRY	DVORAK CODE	COMMENTS	SITE
1 2	130713 131258 131510	14.85	43.6E 44.6E 44.6E	PCN 5 PCN 5 PCN 5	T1.5/1.5	INIT OBS	KGWC KGWC
567	131812 140000 140350 140653	15.15 15.15 14.85 15.25	43.7£ 45.8E 46.1E 45.1E	PCN 6 PCN 4 PCN 6 PCN 5	T2.5/2.5 /D1.0/24HRS	EXP LLCC ULAC 14.8S 045.5E ULAC 14.9S 045.1E	KGUC KGUC KGUC KGUC KGUC
8 9 10	141245 141448 141933	14.45	45 . 7E 46 . 3E 46 . 5E	PCN 5 PCN 5 PCN 6	T2.5/2.5	INIT OBS ULAC 14.95 046.5E	KGWC

11 12 13 14 15	150130 14.7 150329 14.3 150632 13.8 151232 13.8 151427 13.4	S 46.3E S 45.7E	PCN 6 5 PCN 5	T3.0/3.0 /D0.5/24HRS	ULAC 14.8S 046.1E EXP LLCC ULAC 14.2S 046.2E	KGWC KGWC KGWC KGWC
16 17 18 19	151853 13.4 151853 13.4 151813 13.1 160114 12.6 160307 12.5 160745 12.5	S 46.6E S 45.5E S 45.6E S 45.5E	PCN 4 5 6 5 9 PCN	T3.0/3.5 /W0.5/24HRS T3.5/3.5 /D1.0/24HRS	EXP LLCC ULAC 13.2S 045.7E ULAC 11.8S 043.7E ULAC 12.2S 044.3E	KGUC KGUC KGUC
21 22 23 24 25 25	161547 12.3 170104 12.4 170246 12.6 170733 12.4	\$ 46.6E \$ 47.4E \$ 47.0E \$ 47.3E	PCN 4 PCN 4 PCN 5	T2.5/3.0 /W0.5/25HRS T2.5/2.5 /S0.0/24HRS	EXP LLCC ULAC 11.55 042.5E EXP LLCC ULAC 13.95 044.8E EXP LLCC	KGWC KGWC KGWC KGWC
* 27 28 29	171832 13.6 180052 13.1 180406 13.1 180713 13.4	S 46.2E S 46.6E S 48.1E S 48.0E	PON 6 PON 6 PON 6 PON 5	T2.0/2.5 /W0.5/24HRS T1.5/2.5 /W1.0/24HRS		KGWC KGWC KGWC KGWC
* 30 31 32	181127 14.4 181505 13.8 181812 14.6	S 47.9E	PCN 5 PCN 6 PCN 6	T2.0/2.0	INIT OBS	FJDG KGWC KGWC

SYNOPTIC FIXES

F	IX O.	TIME (Z)	FIX POSIT	ION	INTENSITY ESTIMATE	NEAREST DATA (NM)		COMMENTS
*	1	180000	12.15	47.7E	035	045	61968	

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 22S BEST TRACK DATA

021396Z 12.1 1011 2 25 0.0 0 21318Z 12.8 99.7 30 0.0 0 21406Z 13.3 1.00 8 40 13.0 0 21418Z 13.3 101.6 4 40 14.4 0 214.4 0 2156 2 45 13.0 0 21418Z 13.0 102.6 4 40 14.4 0 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2156 2 2	ERRORS 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	T WIND DST WIND POSIT 00.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	00 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 .	0.0 0.
AVG FÖRECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY PIAS NUMBER OF FORECASTS DISTANCE TPAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYC	-1, -0, 0, 0, 0, 15 13 11 0	. 0. 0. 0. 0. 0. 0.	E OVER 35 KTS 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 225 FIX POSITIONS FOR CYCLONE NO. 22

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567890123456789012345678901	1330144006001694496000000000000000000000000	11.00000000000000000000000000000000000	######################################	T1.5/1.5 T1.5/1.5 T1.5/1.5 T3.0/3.0 /D1.5/24HRS T1.5/1.5 T2.5/3.0 /W0.5/24HRS T1.0/1.5 /W0.5/24HRS	ULCC FIX INIT OBS ULCC FIX ULCC FIX ULCC FIX ULCC FIX INIT OBS ULAC 12.2S 099.7E INIT OBS ULAC 12.7S 100.1E ULAC 12.5S 100.6E ULCC FIX INIT OBS ULAC 12.7S 100.1E EXP LLCC ULAC 12.6S 100.4E EXP LLCC ULAC 12.7S 103.3E INIT OBS	######################################
						FGIW

3345 3345 3333 3333 *	152153 152315 160249 160300 160600 160819 160856	13.55 103.6E 12.95 103.5E 13.6S 105.0E 13.75 104.9E 14.15 105.2E 14.55 103.7E	6656656 PPCCCCCC PPCCCCCC	T2.5/2.5 /D1.5/24HRS T3.0/3.0 /D0.5/24HRS T2.5/2.5	INIT OBS	KGWC KGWC KGTW PGTW PGTW KGWC
39012345678 4424444444444444444444444444444444444	15529000960000000300105300000040000072009000000001100006001000000000000000000	14.55 105.3E 14.65 105.8E 15.55 104.4E 15.55 106.1E 16.25 104.7E 16.25 104.7E	20000000000000000000000000000000000000	T3.0/3.0 /D0.5/24HRS T3.0/3.0 /S0.0/24HRS	ULAC 15.35 105.1E ULAC 15.95 103.7E	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
46 47 48 49 51	170300 170411 170600 176815 170843 170900	15.95 104.0E 15.65 104.7E 15.85 103.6E 16.55 103.7E 15.85 103.7E 15.95 103.2E	96465566 PCCXXXX PCCXXX PCCXX	T2.5/3.0 /W0.5/24HRS T2.5/2.5 /50.0/25HRS	ULAC 15.0S 104.7E ÜLAC 16.0S 103.8E ULCC FIX	PGTW KGWC PGTW FJDG KGWC PGTW
9,9123456789901234 4555555555566666	171200 171510 171600 171800 172304 180000	16.55 103.8E 17.15 103.8E 17.15 103.6E 17.35 103.4E 17.35 102.4E	PCN 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	T3.0/3.0 /50.0/25HRS T2.5/3.0 /U0.5/24HRS		PGTU KGUU PGTU PGTU KGUU PGTU
59 66123345 666665	180300 180350 180600 180900 181013 181142 181200	17.65 101.96 17.45 102.6E 17.85 102.8E 17.65 100.8E 17.95 101.6E 17.85 101.7E	56668226	T3.5/3.5 /D1.0/24HRS		KGGTW PGTW PGGWG KGWG PGTW
66 67 69 71	181443 181600 181800 182100 190022 190330	18.65 101.6E 18.25 100.8E 18.65 100.7E 18.95 100.6E 19.35 101.3E	PC 6 6 6 PC 7 PC 7 PC 7 PC 7 PC 7 PC 7 P	T3.0/3.0 /S0.0/24HRS T2.5/2.5 /S0.0/24HRS T3.0/3.0 /S0.0/24HRS T2.0/3.0 /S0.0/24HRS	ULAC 19.25 100.9E	KGUC PGTW PGTW KGUC PGTW KGUC
66666777777777789012	190600 190600 190753 191121 191200 191600 191800	19.05 199.5E 19.05 100.0E 19.35 99.7E 20.05 99.5E 20.75 99.8E	PCX 6 6 PCX	T2.5/2.5 /S0.0/24HRS	ULAC 19.6S 100.2E ULAC 20.1S 099.0E	PGTU KGUC KGUC PGTU PGTU PGTU
79 881 883 885	191856 192100 200000 200001 200300 200310	20.95 99.7E 21.05 99.1E 20.65 98.4E 21.35 98.1E 21.05 98.1E 21.75 97.3E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.5/3.0 /U0.5/24HRS T2.0/2.0 /50.0/24HRS	EXP LLCC	KGUC PGTU KGUC PGTU KGUC PGTU PGTU
* * * * * *	200742 201100 201550 202340 210300 210431 210600	21.95 98.2E 23.345 97.06E 23.45 95.6E 24.45 95.4E 25.65 94.1E	94646 PCC X X X X PCC X X X X X X X X X X X X	T2.0/2.5 /W0.5/24HRS T0.5/1.5 /W1.5/24HRS	ULAC 15.35 105.1E ULAC 15.95 103.7E ULAC 15.0S 104.7E ULAC 16.0S 103.8E ULCC FIX ULAC 19.2S 100.9E ULAC 19.5S 101.3E ULAC 20.1S 099.0E EXP LLCC	KGMC KGMC KGMC KGMU KGMC PGTM FGTM

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 23S BEST TRACK DATA

BEST TRACK WARNIN		HOUR FORECAST 72 HOUR FORECAST
NO NO NO NO NO NO NO NO	-0. 0. 0. 0. 0. 00. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
ALL WENG AVG FORECAST POSIT ERROR 46. AVG RIGHT ANGLE ERROR 31. AVG INTENSITY MAGNITUDE ERROR 4. AVG INTENSITY BIAS -2. NUMBER OF FORECASTS 23 DISTANCE TRHVELED BY TROPICAL CYCLONE IS	94. 119. 0. 0. 0. 53. 58. 0. 0. 0. 11. 15. 0. 0. 0. -35. 0. 0. 0.	E OYER 35 KTS 48-HR 72-HR Ø. Ø. 0. Ø. 0. Ø. 0. Ø. 0. Ø.

TROPICAL CYCLONE 23S FIX POSITIONS FOR CYCLONE NO. 23

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4 5 6 7	120552 121832 130013 130713 131258 131818	16.35 62.9E 17.55 69.9E 18.25 59.9E 19.15 59.8E 18.25 59.8E	0000000 2000000 2000000 2000000 20000000	T1.5/1.5 T1.0/1.5 /W0.5.24HRS	INIT 083 ULAC 18.15 059.3E	KGWC KGWC KGWC KGWC KGWC
8 9 10 * 11 12 13 14 15	141030 141245 141448 141752	######################################	#####################################	T1.5/1.5 /D0.5/25HRS T1.0/1.0	INIT 0BS ULAC 15.1S 057.2E INIT 0BS ULAC 15.0S 056 6F	$ \begin{array}{c} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} x$
16 17 18 19 20 21	150329 150632 151019 151230 151427 151732	16.25 57.8E 15.95 57.9E 16.15 57.5E 16.35 57.5E 16.55 56.5E 16.55 56.0E	PCN 6 4 5 6 6 6 PCN	T1.5/1.5 /S0.0/24HRS T1.5/1.5 /W0.5/24HRS T2.5/2.5 /S0.0/24HRS	EXP LLCC ULAC 15.9S 057.8E	KGWC FJDG KGWC KGWC
23345678 * * 23278	152335 160515 160612 161008 161220	15.95 55.8E 16.05 55.9E 15.25 54.0E 15.45 54.8E 15.35 54.6E	00000000000000000000000000000000000000	T3.0/3.0 /D1.5/24HRS	ULAC 15.0S 056.6E EXP LLCC ULAC 15.9S 057.8E ULAC 15.6S 055.5E ULAC 15.6S 055.7E ULAC 15.2S 055.6E ULAC 15.3S 055.2E	KGWC KGWC KGWC FJDG KGWC
29 30 31 33 * 33	4800067768550800697608550851557778847689790846819195199	16.75 55.3E 16.35 55.6E 16.35 55.7E 16.75 55.6E 17.55 55.6E 17.75 54.6E	PCC	T2.5/2.5 /S0.0/25HRS T2.0/3.0 /W1.0/24HRS T1.5/2.5 /W1.0/24HRS	EXP LLCC ULAC 16.7S 053.7E EXP LLCC ULAC 17.0S 052.0E EXP LLCC ULAC 16.9S 051.9E	KGMC KGMC KGMC KGMC
* 35 * 36 * 38 39 40	180225 180713 181505 181812 182231 190345	######################################	955 955 955 955 955 955 955 955	T1.5/2.0 /W0.5/24HRS T2.5/2.5 /D1.0/24HRS	ULAC 15.65 052.1E ULAC 15.65 052.1E ULAC 15.35 050.4E ULAC 15.95 052.4E	KGWC KGWC KGWC KGWC
42 * 43 * 44 * 45 46	190653 191117 191117 191443 191752 200324 200633	16.95 52.3EE 16.95 52.3EE 16.95 52.3EE 16.35 52.3EE 16.35 52.3EE	PCN 5551666	T2.0/2.0 /S0.0/24HRS T3.0/3.0 /D0.5/24HRS T2.5/2.5 /S0.0/24HRS	ULAC 16.95 052.3E ULAC 16.95 052.0E EYE FIX ULAC 16.4S 052.6E ULAC 16.2S 052.2E ULAC 18.3S 052.3E	KGWC KGWC KGWC KGWC KGWC
48 49 50 51 52 53	201106 201108 201423 201913 202210 210302	18.95 50.6E 18.15 51.7E 18.55 50.5E 19.35 50.2E 20.05 51.0E 20.85 50.5E	PCN 5 PCN 5 PCN 6	T2.5/2.5 /S0.0/24HRS T3.5/3.5 /D0.5/25HRS	ULHO 18.35 VSC.3E	KGWC KGWC FJDG KGWC KGWC
54 556 557 559	210754 211056 211058 211401 211853 220241	20.65 50.8E 21.45 50.1E 20.45 49.8E 21.45 48.8E 21.35 50.0E 21.85 50.1E	PCN 5 PCN 4 PCN 5 PCN 4 PCN 5 PCN 6		EYE FIX EYE FIX EYE FIX	KGWC KGWC FJDG KGWC KGWC
\$55666666666 * *	221045 221521 221833 22148 230410 230713	22.65 50.8E 22.65 50.7E 22.55 50.9E 22.15 50.9E 21.85 53.1E 22.45 50.6E		T3.0/3.0 /S0.0/24HRS T2.5/3.5 /W2.0/24HRS	ULAC 22.5S 052.2E EXP LLCC ULAC 22.5S 053.0E ULAC 22.7S 054.2E ULAC 23.85 051.8E	KGWC KGWC KGWC KGWC KGWC
* 67 68 69 70 71 72 73	22144 22144 230713 230734 231500 231500 231500 2316300 240653	23.05 51.6E 23.05 52.5E 23.25 52.6E 23.45 52.6E 24.35 53.0E	0656665 0777777 000777777 000777777	T3.0/3.0 /D0.5/24HRS T2.5/2.5 /S0.0/24HRS	ULAC 22.5S 052.2E EXP LLCC ULAC 22.5S 053.0E ULAC 23.7S 054.2E ULAC 23.8S 051.8E ULAC 23.8S 051.5E ULAC 24.0S 052.1E ULAC 24.0S 052.2E ULAC 24.6S 052.2E ULAC 24.5S 052.6E	KGWC KGWC KGWC KGWC KGWC
73 74 75 * 76 * 77 78 79	241023 241024 241438 241752 242127 250319 250633	24.65 53.0E 24.35 53.8E 25.45 54.6E 26.15 53.0E	PCN 6 PCN 6 PCN 6 PCN 3 PCN 3	T2.5/2.5	ULAC 27.05 055.6E EXP LLCC	KGWC FJDG KGWC KGWC KGWC
* 823 * 83 84 85	251155 251155 2511732 260612 261712 270734 271833	25.45 52.6E 25.6S 53.8E 25.6S 55.0E 25.6S 55.2E 26.6S 55.2E 27.2S 55.2E	PCN 4 6 6 6 6 4 PCN 4 PCN 7 PC	T1.0/2.0 / W1.5/24HRS T2.0/2.0 / D1.0/24HRS T1.0/2.0 / W1.0/25HRS	EXP LLCC EXP LLCC EXP LLCC	KGWC KGWC KGWC KGWC
86	280713	32.65 53.1E	РСН З		EXP LLCC	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 24S BEST TRACK DATA

BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST
021900Z 12.8 77.6 35 1 021912Z 13.8 79.1 35 1 022000Z 15.2 80.8 30 1 022012Z 17.0 83.3 25 1	POSIT UIND DST UIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ERRORS POSIT WIND DST WIND 0.0 0.0 00. 0. 1. 6.3 70.0 55. 627. 25. 1. 5.8 80.4 45. 167. 20.	ERRORS POSIT WIND DST WIND 0 0 0 0 0 -0 0 0 7.7 67.0 70.1124 45.0 0 0 0 0 -0 0 0	POSIT WIND DST WIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.

> TROPICAL CYCLONE 24S FIX POSITIONS FOR CYCLONE NO. 24

SATELLITE FIXES

FIX NO.	TIME (2)	POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1234567890112345678901 * ** * * * * * *	28112753141 7009653161411 118091533141 118091533141 118091533161 1181162513161451 11909161451 11909161451 11909161451 11909161451	55555555555555555555555555555555555555	65645464645444466665555555555555555555	T1.5/1.5 T1.5/1.5 T2.5/2.5 /D1.0/24HRS T2.0/2.0 /D0.5/24HRS T2.6/2.6 T3.5/3.5 /D1.0/24HRS T3.5/3.5 /D1.5/24HRS T1.5/2.5 /W1.0/27HRS T0.5/1.5 /W2.5/24HRS T1.5/2.5 /W1.5/24HRS	INIT OBS INIT OBS ULAC 11.9S 089.8E ULAC 11.5S 073.2E ULAC 12.2S 073.4E ULAC 12.1S 073.8E INIT OBS INIT OBS INIT OBS ULAC 12.0S 74.9E ULAC 13.3S 074.6E ULAC 13.4S 74.0E ULAC 13.4S 71.7E EXP LLCC ULAC 13.6S 71.8E EXP LLCC EXP LLCC EXP LLCC EXP LLCC EXP LLCC EXP LLCC	00000000000000000000000000000000000000

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 255 BEST TRACK DATA

BEST TRACK	WARNING ERRORS 24 F	OUR FORECAST 48 HOUR FORECAST	72 HOUR FORECAST
0216182 13.5 122.3 25 6.0 0 0 0217082 13.9 120.8 25 0.0 0 0 0217182 14.1 119.1 30 0.0 0 0 0218062 14.5 117.9 30 0.0 0 0 0218062 15.3 115.6 45 15.4 115 0219182 15.4 114.0 55 15.3 113 0220082 15.7 110.6 75 16.0 110 0221082 15.7 110.6 75 16.0 110 0221082 16.0 108.8 5 16.0 108 0221082 17.9 102.7 55 17.0 104 0222182 17.9 102.7 55 18.0 102 0223182 21.0 99.4 55 21.3 99 0224062 22.9 97.5 55 22.8 97	0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	90. 72. 30. 19.5 102.4 75. 98. 20. 65. 63. 10. 18.6 101.8 55. 54. 0. 55. 91. 0. 19.9 97.3 45. 13510. 50. 755. 20.8 95.3 45. 17610. 45. 9910. 23.2 94.7 40. 17610. 45. 5710. 24.5 93.2 94.7 40. 17910. 45. 5710. 24.5 93.2 30. 17415. 45. 1215. 30.6 91.3 40. 3675. 45. 197. 0. 0. 0. 0. 0. 0. 0.	POSIT UND DST
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY BLAS AVG INTENSITY BLAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CY AVERAGE SPEED OF TROPICAL CYCLON		TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 255
FIX POSITIONS FOR CYCLONE NO. 25

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3 4 5 6	170000 170229 170843 170900 171022 171200	14.35 121.5E 14.45 121.3E 14.05 118.7E 14.45 119.4E 13.05 119.9E	PCN 6 6 5 PCN 6 PC	T1.0/1.0 T1.5/1.5	INIT OBS INIT OBS ULAC 12.85 121.1E ULAC 14.15 117.4E	PGTU KGWC KGWC PGTU KGWC PGTU
7 8 9 10 11 * 12	171328 171600 171800 171946 172302 180000	13.95 119.3E 13.85 119.5E 14.05 119.4E 14.05 119.4E 14.75 118.1E 15.25 117.4E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T1.0/1.0	ULAC 13.3S 118.5E INIT OBS ULAC 13.5S 118.5E ULAC 15.4S 116.3E	KGWC PGTW PGTW KGWC KGWC
13 * 14 15	180209 180300 180831	13.95 118.2E 15.45 116.7E 14.85 117.8E	PCN 5 PCN 6 PCN 6	T1.5/1.5 /S0.0/24HRS T1.0/1.0 /S0.0/27HRS		PGTW KGWC PGTW KGWC

16 181001 14.55 117.5E PCN 6 * 17 181200 15.65 115.8E PCN 6	6	ULAC 14.4S 116.3E	KGWC PGTW KGWC
18 181449 15.45 117.9E PCN (* 19 181600 15.65 115.6E PCN (6 T2.0/2.0 /D1.0/24HRS	ULAC 14.05 115.9E	PGTW PGTW
* 20 181800 15.35 115.3E PCN (* 21 182100 15.85 114.8E PCN (22 182241 15.3S 116.8E PCN (6	ULAC 14.55 117.2E	PGTU
23 190000 14.95 116.2E PCN 0 24 190300 15.15 115.7E PCN 0	6		KGUC PGTW PGTW
25 190330 14.95 116.8E PCN 36 190600 15.15 115.2E PCN 3	5	ULAC 15.45 113.9E	KGWC PGTW
27 190611 15.05 115.1E PCN 1	4	ULAC 14.15 114.9E	KGWC PGTW KGWC
* 29 190939 14.95 113.9E PCN 30 191200 15.35 114.3E PCN 31 191429 17.15 113.3E PCN 32 191600 15.35 114.0E PCN	6	ULAC 14.5S 114.2E INIT OBS ULAC 16.5S 113.8E	PGTW KGUC
32 191600 15.35 114.0E PCN	6 T3.5/3.5 /D1.5/24HRS		PGTW
33 191800 15.35 113.8E PCN 1 34 191856 16.85 112.8E PCN 1 35 192100 15.25 113.1E PCN 1	6	ULAC 15.0S 112.6E	KG U C PGTW
36 192220 14.85 112.5E PCN 37 200000 15.55 112.4E PCN	6 · 6		KGWC PGTW
38 200300 16.0S 113.0E PCN 39 200310 14.8S 112.7E PCN	6 T4.0/4.0~/D1.0/24HRS 5 T3.5/3.5 /S0.0/24HRS		PGTW KGWC PGTW
40 200600 15.85 112.2E PCN 41 200742 15.15 112.0E PCN 42 200900 15.85 111.7E PCN	6 5 6	ULCC FIX	KGHC
42 200900 15.85 111.7E PCN 43 201100 16.0S 111.3E PCN 44 201200 16.1S 111.3E PCN	6	ULCC FIX ULAC 16.35 112.0E	KGWC PGTW
45 201600 15,95 110.8E PCN	6 T4.5/4.5 /D1.0/24HRS		PGTU PGTU
* 47 201846 17.05 111.1E PCN 48 202100 15.75 110.0E PCN	6	III AC 16 95 110 35	KGWC PGTW KGWC
49 202340 16.05 110.2E PCN 50 210000 16.05 109.7E PCN	6 6 5 T3.0/3.5 /W0.5/24HRS	ULAC 16.85 110.2E ULCC FIX	PGTW KGWC
51 210249 16.05 109.9E PCN 52 210300 15.7S 109.1E PCN 53 210600 16.1S 108.9E PCN	6 T3.5/4.0 /W0.5/24HRS	ULCC FIX ULCC FIX	DOTH
54 210731 16.05 108.9E PUN EE 210900 16.25 108.3E PUN	5 6	ULCC FIX	
56 211038 15.85 108.1E PCN 57 211200 16.2S 107.7E PCN	6 6	ULCC FIX	KGWC PGTW KGWC
59 211600 16.15 106.7E PCN	6 T3.0/3.5 /W1.5/24HRS	ULCC FIX	PGTW PGTW
60 211800 16.35 106.1E PCN 61 211835 16.65 106.5E PCN 62 212100 16.15 105.6E PCN	6	ULCC FIX	KĞÜĞ PGTW
63 212349 17.05 105.4E PUN		ULCC FIX	KGWC PGTW
65 220229 17.35 105.2E PCN	6 T3.5/3.5 /D0.5/24HRS	ULÇÇ FİX	KGWC PGTW
67 220600 17.15 104.4E PCN 68 220721 17.55 103.4E PCN	6	ULCC FIX	PGTW KGWC PGTW
69 220900 17.0S 103.5E PCN 70 221017 17.4S 104.1E PCN 71 221200 17.0S 102.9E PCN	6	ULAC 17.35 103.5E	KĞWC PGTW
72 221510 18.45 103.0E FOR	6 T3.0/3.5 /W0.5/24HRS 6 T3.0/3.5 /S0.0/24HRS	ULCC FIX ULAC 17.3S 103.5E ULCC FIX ULAC 17.4S 102.7E	KGUC PGTW
73 221600 17.35 102.2E PCN 74 221800 17.45 101.6E PCN 75 221824 18.85 103.2E PCN	6	ULAC 17.45 102.7E ULCC FIX ULAC 18.05 102.3E ULCC FIX EXP LLCC	PGTW KGUC
* 76 222100 17.8S 101.0E PCN 77 230000 18.7S 102.6E PCN	6 4		PGTW PGTW KGWC
78 230039 19.05 102.4E PCN 79 230300 18.95 101.8E PCN	4 T2.5/3.5 /W1.0/24HRS	EXP LLCC	PGTW
80 230350 19.05 101.9E PCN 81 230600 19.35 101.4E PCN 82 230710 19.45 101.6E PCN	4	EXP LLCC EXP LLCC ULAC 18.65 101.7E EXP LLCC	PGTW KGUC
83 230900 19.55 100.9E PCN 84 231137 20.55 100.1E PCN	6	EXP LLCC	
85 231200 19.85 100.2E PCN 86 231449 21.15 99.4E PCN	6 T2.5/3.0 /W0.5/24HR5	ULAC 20.4S 099.0E Exp LLCC	PGTW KGWC PGTW
87 231800 20.65 99.1E PCN 88 231955 21.1S 99.8E PCN 89 240000 22.0S 98.1E PCN	6	EXP LLCC	KGUC PGTW
55 546649 TO TO DO CE DON	2	2 2011	KGUC PGTU
92 240330 22.55 97.8E PCN 93 240600 23.05 96.9E PCN	5 T3.5/3.5 /D1.0/24HR5		KGMC PGTW KGMC
94 240841 23.25 96.9E PCN 95 240841 23.25 96.8E PCN	5 T 3.5/3.5	INIT OBS	FJDG PGTW
96 240900 23.35 96.7E PCN 97 241116 23.75 96.5E PCN 98 241200 23.45 95.9E PCN	6	ULCC FIX	KGWC PGTW
98 241200 23.45 95.3E PCN	6 T2.5/2.5 /S0.0/24HRS	HI CO ETY	KGWC PGTW
100 241600 24.55 95.7E PCN 101 241800 24.7S 95.4E PCN 102 241945 25.1S 96.4E PCN	6	ULCC FIX ULAC 25.95 095.5E	PGTW KGWC PGTW
103 242100 25.15 94.9E PCN	6 6	ULCC FIX ULAC 25.9S 095.5E ULCC FIX ULAC 25.9S 095.5E ULCC FIX	KGWC PGTL
105 250000 26.05 95.4E PCN	6 T3.5/3.5 /S0.0/24HRS	ULCC FIX EXP LLCC	PGT L KGWO
108 250600 27.45 95.3E PUN	6	EXP LLCC ULCC FIX	PGTL KGUC
110 250900 28.2S 95.5E PCN	I 4	EXP LLCC	PGTL KGUC
112 251200 28.6S 94.7E PCN	l 6	ULCC FIX	PGTU KGWO PGTU
115 251934 30.05 95.8E PCN	1 6		KGWC KGWC
116 252336 31.35 96.0E FCN 117 260431 33.55 97.7E PCN	6 T1.5/2.5 /W0.5/24HRS	ULAC 35.05 100.3E	KGWC PGTL
119 261039 35.45 98.2E PCN	16	EXP LLCC	KGUC KGUC KGUC
121 270411 37.55 102.8E PCN	1 4	EXP LLCC	KGW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 26P BEST TRACK DATA

0219182 14.1 145.9 25 0.0 0220062 15.5 146.7 35 15.2 14 0220182 17.7 148.0 45 17.4 14 0220182 20.4 149.5 40 20.3 14 0221182 22.3 150.8 35 23.4 15. 0222062 23.4 152.0 30 23.3 15 0222062 24.4 154.0 25 24.4 15	0.0 00. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	0 0 0 0 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	48 HOUR FORECAST POSIT WIND DST WIND 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	72 HOUR FORECAST ERRORS 0.0 1.0 UIND DST UIND 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CY AVERAGE SPEED OF TROPICAL CYCLOR		72-HR URNG 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:	

TROPICAL CYCLONE 26P FIX POSITIONS FOR CYCLONE NO. 26

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12345	170048 171328 190300 190600 191600	12.15 137.8E 15.05 138.0E 12.45 145.2E 12.75 145.2E	PCN 5 PCN 6 PCN 6 PCN 6 PCN 6	T1.5/1.5 T1.0/1.0	INIT OBS ULAC 15.15 136.8E INIT OBS INIT OBS ULCC FIX ULCC FIX ULCC FIX INIT OBS ULAC 16.85 147.0F	CCEECECECCO DAGGORDO DE DE DE DE DE DE DE DE TE TE TE TE TE DE DE TE TE TE DE
5 6 7 8	191800 192100 200000	14.35 145.9E 14.35 146.3E 14.45 146.4E	PCN 6	T2 E/2 E /D1 E/241100	INIT OBS	PGTW PGTW PGTW
8 9 10 11	200128 200300 200418	14.65 146.9E 14.95 146.6E 14.85 146.5E	PCN 6 PCN 6 PCN 6 PCN 4 PCN 6	T2.5/2.5	INIT OBS ULCC FIX	PGTW KGWC PGTW
12 13 14	200418 200600 200900 201200 201227	15.55 146.5E 16.0S 146.9E 16.4S 147.3E	PCN 4 PCN 4 PCN 6		INIT OBS ULCC FIX ULCC FIX ULCC FIX INIT OBS ULAC 16.85 147.0E	KGUC PGTW PGTW
01127456789012374567890012374567890 1111111112222222222222222373373373737373	201227 201600 201704 201800 202017 202100	######################################	PCC Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	T2.5/2.5 T3.0/3.0 /D1.5/22HRS		PGTW
25 22 23	210000 210108 210300 210407	18.55 148.3E 19.35 148.9E	PCN 6 PCN 6	T2.5/2.5 /S0.0/24HRS T2.5/2.5-/S0.0/24HRS	ULCC FIX	PGTU PGTU KGUC
25 25 26 27	210407 210600 210900 211200	19.95 149.2E 20.35 149.5E 21.45 150.2E 22.45 150.7E	PCN 6 PCN 6 PCN 6 PCN 6		ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTW KGWC PGTW PGTW
* 28 * 29 * 30 * 31	210407 210600 210900 2112007 211511 211507 211511 211800 211800 2109000 22000048 2200000 2200000 2200000 2200000 2200000 22000000	23.15 151.5E 23.35 152.6E 24.65 151.9E 25.25 152.7E 23.25 151.2E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2.5 /S0.0/24HRS		
33 34 35 36	220000 220048 220300 220600 220836	23.15 151.1E 23.25 151.3E 23.25 151.4E 23.55 151.9E	PCN 4 PCN 3 PCN 4 PCN 4 PCN 4	T1.0/2.0 /W1.5/24HRS T1.0/2.0 /W1.5/24HRS	EXP LLCC EXP LLCC	KGWC PGTW KGWC PGTW PGTW
38 39 40	221200 221600 221642	23.55 153.2E 24.0S 153.7E 24.1S 153.0F	PCN 6 PCN 6 PCN 6	Т0.0/0.0	EXP LLCC EXP LLCC INIT OBS EXP LLCC	KGWC PGTW PGTW
41 42 43	222116 230028 230300 230600	24.95 154.3E 23.85 155.1E 23.75 155.6E	PCN 4 PCN 3 PCN 4	T0.0/1.0 /W1.0/24HRS T0.0/1.0 /W1.0/24HRS T0.0/0.0 /S0.0/24HRS	EXP LLCC EXP LLCC EXP LLCC	KGWC KGWC KGWC
44 45 46	230600 240300 250000	23.95 156.2E 23.95 158.7E 22.25 160.9E	PCN 4 PCN 4 PCN 4	T0.0/0.0 /S0.0/24HRS	EXP LLCC EXP LLCC EXP LLCC	PGTW PGTW PGTW

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.



	BEST TRAC	K .	JARNING ER	RORS 24	HOUR FORECAST ERRORS	48 HOUR		72 HOU	R FORECAST
MO/DA/HR 0304062 0304182 0305062 0305182 0306062	POSIT 16.7 170.7 17.6 172.0 19.5 173.3 21.4 174.9 23.1 176.7	WIND POSIT 30 0.0 0.1 35 0.0 0.1 35 19.7 172.1 40 21.8 175.1 45 24.5 176.1	WIND DST 00. 00. 35. 26. 35. 33.	WIND POSIT 0. 0.0 0. 0. 0.0 0. 0. 23.1 175. -5. 25.7 178.	WIND DST WIN 0 00. 0. 0 00. 0. 4 45. 72. 0. 7 45. 915.	D POSIT WIN 0.0 f 0.0 0. 0.0 0.0 0. 26.7 179.3 35. 29.9 181.3 35.	-0. 0. 0 -0. 0. 0 13020. 0	POSIT W	ERRORS IND DST WIND 00. 0. 00. 0.
030618Z 030706Z 030718Z 030806Z 030818Z	24.2 179.0 25.0 180.8 26.1 182.3 29.4 185.6 34.3 191.0	50 25.8 178.1 55 26.6 180. 50 26.2 182. 45 28.4 185. 40 35.1 191.	45. 105. 50. 103.	0. 29.7 179. -5. 30.1 180. -5. 30.0 182. 0. 30.2 186. 0. 0.0	8 35. 25315. 4 45. 171. 0. 2 40. 346. 0.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	-0. 0. 0 -0. 0. 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	00. 0. 00. 0. 00. 0. 00. 0.

14. KNOTS

AVERAGE SPEED OF TROPICAL CYCLONE IS

TROPICAL CYCLONE 27P FIX POSITIONS FOR CYCLONE NO. 27

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
2345	020900 021900 0212327 030000 030300 030401 030600	14.65 172.0E 14.45 169.4E 16.65 171.4E 17.45 170.9E 17.45 170.7E 15.85 170.7E 16.75 170.7E	00444500 777777777 0000000000 0000000000	T1.0/1.0 T1.5/1.5 T1.5/1.5	INIT OBS ULCC FIX INIT OBS EXP LLCC INIT OBS EXP LLCC EXP LLCC	PGTW PGGWC PGGWC PGGWC PGWC PGWC KGWC
90 112 112 14 15 * 16	010600656700006046000500000000000000000000	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	2222222 2222222 20000000 2000000000000	T2.5/2.5 /D1.0/24HRS T1.5/1.5 /S0.0/24HRS	ULAC 16.9S 172.9E ULAC 17.0S 172.0E ULAC 17.0S 172.0E ULAC 16.8S 171.5E ULCC 16.8S 171.4E ULCC FIX INIT 0BS ULAC 15.8S 171.3E ULCC FIX ULCC Z3.5S 178.0E ULAC 23.5S 176.3E ULCC Z3.9S 177.6E ULCC Z3.9S 177.6E ULCC FIX	PGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
21 22 23	040900 041006 041600 042246 050000 050300 050600	16.85 171.2E 16.15 171.3E 16.85 171.6E 18.15 172.7E 19.15 172.7E 19.35 172.7E	2222222 2222222 2000000000000000000000	T2.5/2.5 T3.0/3.0 /D0.5/24HR5 T2.5/2.5 /D1.0/24HRS	ULCC FIX UNIT OBS ULAC 15.8S 171.3E ULCC FIX ULAC 18.5S 172.5E ULCC FIX ULCC FIX ULCC FIX	FGUC PGTW FGTW FGTW FGTW
**************************************	050523 0509453 051443 0518003 05512200 060300	20.35 173.5E 20.35 173.9E 19.85 173.9E 21.65 174.6E 21.75 175.4E 22.85 176.2E	######################################	T2.5/2.5 /S0.0/24HRS T2.0/2.0 T3.0/3.0 /S0.0/24HRS T3.0/3.0 /D0.5/24HRS	INIT OBS ULAC 20.6S 174.9E ULAC 21.8S 176.3E	KGWC KGWC PGTW KGWC PGTW PGTW
** * ** *	05000000000000000000000000000000000000	21.75 176.5E 24.75 176.5E 22.35 176.6E 25.35 177.1E 24.05 178.2E 24.05 178.4E 24.35 179.0E	66666646 CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	T3.5/3.5 /D1.0/24HRS T2.5/2.5-/D0.5/28HRS	ULCC 23.5S 178.0E ULAC 23.5S 176.9E ULCC 23.9S 177.6E ULCC FIX RGD EYE DIA 1 DEG ULCC FIX	PGUU PGUU PGUU PGUU PGTU
67.856±1074567.856±10745678 5555444444444455555555555555555555555	062100 062206 070000 070318 070400 070600	24.35 179.6E 24.35 179.4E 25.05 180.8E 24.35 179.8E 24.35 179.8U 24.55 179.8U 24.56 179.8U	14000040000000000000000000000000000000	T3.5/3.5 /D0.5/24HRS T3.5/3.5-/D0.5/24HRS	ULAC 24.7S 180.0E ULAC 16.9S 172.9E ULCC FIX ULCC FIX ULCC FIX	KGUUU KGUUU KGUUU KGUUU KGUU KGUU PGTU
499 55 55 55 55	070905 071200 071422 071821 0721467 080519 080845	24.45.179.1W 25.25.178.4W 25.45.177.2W 26.25.177.2W 26.95.176.4W 28.85.174.7W	PC	T3.5/3.5 /S0.0/24HRS T2.5/3.5 /W1.0/24HRS T3.0/3.5 /W0.5/24HRS	ULAC 24.95 179.4W ULAC 28.85 173.7W ULAC 30.25 172.4W EXP LLCC	00000000000000000000000000000000000000
55 56 57 58	080845 081411 081759 082125	30.95 172.5W 32.05 171.3W 35.15 168.5W 36.05 167.0W	PCN 6 PCN 6 PCN 6 PCN 6 PCN 4	T0.0/1.5 /W2.5/24HRS	EXP LLCC	KGWC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 28S BEST TRACK DATA

BEST TRACK MO/DA/HR	90.8 35. 59. 10. 13. 90.88 45. 3710. 14. 88.1 60. 34415. 15. 86.6 66. 65. 2130. 14. 85.0 90. 5015. 14. 84.9 105. 65. 16. 84.1 120. 21. 5. 18. 84.3 125. 13. 10. 19. 85.0 90. 0. 0. 21. 85.0 90. 0. 0. 21. 85.0 90. 0. 0. 21. 85.0 90. 0. 0. 21. 86.0 55. 3810. 22. 86.0 55. 13. 0. 24. 88.0 50. 32. 0. 26. 88.9 45. 32. 0. 0.	6 87.3 55. 5940. 28.43 70. 9335. 25. 25. 25. 25. 25. 25. 25. 25. 25. 2	48 HOUR FORECAST ERRORS OF STANDING OF STA	72 HOUR FORECAST POSIT UIND DST UIND 0. 0 0. 0 0. 0 00 0. 0 0. 0 0. 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS	ALL FORECASTS URNG 24-HR 48-HR 27. 101. 232. 16. 68. 161. 8. 18. 2944. 4. 16. 14. 12	72-HR URNG 0. 0. 0. 0. 0. 0. 0. 0. 0.	OONS WHILE OVER 35 KTS 24-HR 4B-HR 72-HR 0. 0. 0. 0. 0. 0. 0. 0. 0.	

TROPICAL CYCLONE 285 FIX POSITIONS FOR CYCLONE NO. 28

SATELLITE FIXES

FIX No.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
10345678901 11	040411 0415130 0603300 06038450 0608450 0616611 061800 061611 061800 0623	10.655 98.8EE 10.555 995.1E 11.325 94.1E 11.325 97.3EE 11.325 97.3EE 11.325 97.4EE 11.325 91.6EE 11.325 91.6EE	00000000000000000000000000000000000000	T1.5/1.5 T3.0/3.0 /D0.5/24HRS T1.5/1.5 T2.5/2.5 /D1.0/24HRS T2.5/2.5 T2.0/2.0 T3.0/3.0 /D0.5/25HRS	INIT OBS ULAC 12.0S 098.0E INIT OBS INIT OBS INIT OBS ULCC FIX ULAC 12.3S 092.4E ULCC FIX ULCC FIX	KGWCC KGWTW FJDWG KGTWC KGTWW KGGTWW PGGWW KGWTWC
12 13 14 * 15 16 17 18	070400 070451 070600 070818 070824 070900 071226 071551	12.7S 91.8E 12.0S 91.5E 12.6S 91.0E 12.2S 91.0E 12.2S 91.2E 12.8S 90.7E	2222222 2222222 22222222 2000000000000	T3.0/3.0 /D1.5/22HRS T3.5/3.5 /D0.5/25HRS T3.0/3.0 /D0.5/24HRS	ULCC 12.1S 091.0E ULAC 12.4S 091.0E ULCC FIX ULCC FIX EYE FIX	PGTU KGGTU KGGTU FJUUU FGGUU PGGUU KGUUC
0100456789 00000000000	071300 071800 071800 071928 072100 080000 080100 080431 080431	13.45 89.7E 13.15 89.5E 13.48 89.5E 13.865 88.5E 13.665 88.5E 13.65 88.0E 13.55 87.5E 13.55 87.9E		T4.0/4.0 /D0.5/24HRS	EYE FIX ULCC FIX ULCC FIX EYE FIX ULCC FIX EYE FIX EYE FIX EYE FIX	PGTU PGGUC PGGUTU PGGUU PGGUU PGGUU KGGUU
290123345678 *	080814 080900 081200 081205 081530 081600 082059 082100	13.15 86.2E 13.15 86.74E 13.85 86.4E 12.95 86.4E 14.05 85.5E 14.05 85.0E	PCN 4 2 6 6 6 PCN	T4.5/4.5 /D1.0/24HRS T5.5/5.5 /D1.0/25HRS	EYE FIX EYE FIX	FJDF33 PPGG33 KKGGPPGG3 PFG3T1 FGT1 FGT1
39 41 42 43 44 45 46	090000 090045 090400 090411 090803 090945 091143	14.55 85.2E 14.6S 85.8E 14.7S 85.1E 14.7S 85.3E 15.1S 84.9E 15.1S 85.0E	PCH	T5.0/5.0 /D1.0/24HRS	EYE DIA .5 DEG EYE DIA .7 DEG EYE DIA .6 DEG EYE FIX EYE DIA .7 DEG	PGUUU KGUUU PGUUU PGUUU KJUU KJUU
4789012341 5555555	091200 091651 092048 092100 100000 100023 100400 100532	15.65 84.9E 16.55 84.6E 16.75 84.4E 16.75 84.9E 17.05 84.1E		T6.5/6.5 /D1.0/25HRS T6.5/6.5 /D1.5/25HRS	EYE FIX EYE DIA 3/4 DEG EYE DIA 1/2 DEG EYE FIX EYE DIA .6 DEG	PGGGG PGGGG PGGGG PGGGG PGGGG
55555566666666666666666666666666666666	100600 100900 100934 100934 101302 101631 101800 102038	17.45 83.9E 17.65 84.2E 17.65 84.2E 17.95 84.9E 18.55 84.6E 18.45 84.7E	22222222222222222222222222222222222222	T6.0/6.0 /D1.0/24HRS	EYE FIX	PGGUUCUC PGGUUCUC FGGUUCUC FGGUUCUC FGGUUCUC
3456789671	102100 110000 110144 110400 110500 110900 110923	18.95 84.7E 19.45 84.9E 19.35 84.7E 19.35 84.7E 19.75 85.1E	24666666 7777777777777777777777777777777	T4.0/5.0 /W2.5/24HRS	EYE FIX ULCC FIX ULCC FIX ULCC FIX	PGTW PGWUC KGGTW KGWUC PGTW PGTW KGWUC
723 7756 7789 789	111200 111242 111600 111611 1118027 120122 120400 120452	86 11 19 25 86 15 19 25 86 55 19 25 86 55 10 25 86 55	666464464 CCCCCCCCCCCCCCCCCCCCCCCCCCCCC	T3.0/4.0 /U2.5/24HRS	ULAC 21.25 086.2E ULCC FIX EXP LLCC ULAC 22.35 086.9E ULCC FIX EXP LLCC EXP LLCC EXP LLCC	PGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
81 883 885 86 87	120600 121221 121550 122016 130101 130300 130431	20.95 84.66 20.85 85.9E 21.75 86.6E 22.65 87.2E 22.15 85.5F	PCN 6 PCN 6 PCN 6 PCN 4	T2.5/2.5 /D0.5/24HRS	INIT OBS ULAC 17.08 087.1E ULAC 22.65 086.9E EXP LLCC ULAC 22.88 087.3E EXP LLCC ULAC 23.38 088.0E	PGWC KGWUC KGGWC KGGWC KGGWC KGWC
90	130902 131200 131530 132005 140040 140852 141138 141510	137.79.28.28.28.29.29.19.19.29.29.29.29.29.29.29.29.29.29.29.29.29	666644544 CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	T2.5/3.0 /W0.5/24HRS T1.5/2.5 /W1.0/24HRS T1.5/1.5 /W1.0/24HRS T1.5/2.5 /W1.0/24HRS	EXP LLCC DLAC 27.25 093.3E	KGWC KGWC KGWC KGWC KGWC FJDG KGWC
97 98	141954	26.45 94.5E 26.7S 95.6E	PCN 4 PCN 3		EXP LLCC EXP LLCC EXP LLCC	KGUC KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 295 BEST TRACK DATA

MO/DA/HR POSIT WIND POSIT 0308062 12 4 117.7 35 11 9 117 0308062 15 6 199.2 45 12.8 112 0309062 15 6 120.5 55 16.0 120 0309182 18.2 121.7 55 18.5 121 0310062 20.1 123.5 45 20.2 123	T UIND DST WIND POSIT 18.0 40. 51. 51. 13.7 116.1 8.0 45. 85. 6.14.9 118.6 8.3 8.5 9.0 21.7 122.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7 52.6 1.7	55. 266. 10. 0.0 0.0 0e. 0. 30. 10815. 0.0 0.0 0e. 0. 0. 0. 0. 0e. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	72 HOUR FORECAST ERRORS 0.0 0.0 0.0 -0. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0. 0.0 0.0 00. 0.
AVG FORECAST POSIT ERROR AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY HEADITUDE ERROR AVG INTENSITY BEAS AVMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYCLON AVERAGE SPEED OF TROPICAL CYCLON		TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 29S FIX POSITIONS FOR CYCLONE NO. 29

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
12045678901120456789011204567890	08000000000000000000000000000000000000	######################################		T1.0/1.0 T3.0/3.0 T2.5/2.5 T3.0/3.0 T2.5/2.5 /D1.5/24HRS T3.5/3.5-/D0.5/24HRS	INIT OBS INIT OBS ULAC 12.7S 117.3E ULAC 13.1S 116.8E INIT OBS ULAC 13.0S 117.9E ULAC 13.8S 118.7E INIT OBS ULAC 13.9S 119.5E ULAC 15.0S 120.4E	

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 30P BEST TRACK DATA

0312002 14.7 170.4 25 0.0 0312122 14.9 167.9 30 0.0 03131002 14.1 166.1 40 14.4 03131002 13.3 165.0 50 12.9 03144002 12.5 164.6 60 13.0 0314122 11.8 165.9 80 11.4 03155002 12.1 167.3 100 11.7 0315102 12.8 169.4 109.1 17.0 0315122 12.8 169.4 12.5 16.3 100 14.2 0316122 16.4 175.0 135 16.3 0317002 19.3 177.3 110 19.1 0317102 24.2 179.3 90 23.6 03181002 29.2 181.3 70 30.5 0318122 32.5 184.5 50 33.5	0.0 00. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	0 0 0 0 -0. 0 0 0 0 -0. 5 162.4 555 176. 5 163.5 75. 2124 163.5 75. 2248 170.7 110. 1778 170.7 110. 1773 177. 4 135. 60. 8 170.7 110. 175. 60. 8 180.7 110. 163. 2 182.4 95. 1895 183.2 75. 66. 9 191.6 50. 164.	RS ERRORS UIND POSIT WIND DST WIND 0. 0.0 0.0 0. 0. 0. 0. 0. 0.0 0.0 00. 0. 5. 15.0 160.0 65. 46035. 15. 12.9 160.0 65. 55055. 15. 12.9 161.5 90. 64640.	72 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCI	0, 0, 2, 13 11 9 CYCLONE IS 2469. NM	72-HR WI 0. 0. 0. 0.	TYPHOONS WHILE OVER 35 KTS ING 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 30P FIX POSITIONS FOR CYCLONE NO. 30

SATELLITE FIXES

FIX	TIME	FIX POSITION			204451770	SITE
į	102226 111107	988875865902111416027459941188957578994276976759448989115459911797666667877877777777777777777777777	PCN 1 PCN 6	T1.5/1.5 T1.5/1.5 T1.5/1.5	INIT OBS ULCC FIX INIT OBS ULCC FIX ULAC 13.45 164.8E INIT OBS ULAC 12.45 164.7E ULAC 13.25 165.0E ULAC 12.35 164.6E ULAC 12.35 164.6E ULAC 12.15 164.2E ULAC 12.15 164.2E ULAC 11.85 166.9E EYE DIA 16 NM EYE FIX EYE DIA 12 NM EYE DIA 12 NM EYE DIA 12 NM EYE DIA 12 NM EYE FIX	KGMC KGMC PGTW
3	111800	14.75 171.8E 14.55 171.7E	PCN 6 PCN 6	T1.5/1.5	INIT OBS	PGTW PGTW KGUC
6	120000	13.95 170.6E	PCN 6	T1 5/1 5	ULCC FIX INIT OBS	PGTW PGTW
, 9	120600	15.35 169.0E 14.95 168.2E	PCN 6 PCN 6		ULCC 15.1S 168.3E ULCC FIX	PGTW PGTW
10 11	121046 121200	14.95 169.2E 15.05 168.1E	PCN 6	T2.0/2.0 /D0.5/18HRS	ULCC FIX	KGWC PGTW
12 13	121600	14.85 167.1E 14.7S 167.6E	PCN 6			PGTU
15 16 17	121957	14.55 166.7E 14.65 166.4E	PCN 5 PCN 6			KĞÜĞ PGTW
17 18	122326 130000	14.05 166.5E 14.25 165.9E	PCN 6	T3.0/3.0 /D1.0/24HRS T3.0/3.0-/D1.5/20HRS	ULCC EIX	KGUC PGTW
19 20	130300	13.75 165.4E 13.35 165.1E	PCN 6		ULAC 13.45 164.8F	PGTW
55	130900	13.35 164.8E 13.95 164.9E	PCN 6	T3.0/3.0	INIT OBS-ULAC 12.45 164.7E	PGTW KGWC
24 25	131200 131459	12.95 164.5E 13.15 164.7E	PCN 6 PCN 6	T2.0/2.0 /S0.0/24HRS	ULAC 13.25 165.0E	PGTW KGWC
01234567890 22222222222	131600 131936	13.35 164.7E 13.05 164.8E	PCN 6		ULAC 12.65 164.8E	PGTW KGWC PGTW
29	132306	12.65 164.7E	PCN 6	T4.0/4.0 /D1.0/24HRS	ULAC 12.35 164.6E ULCC FIX	KGUC PGTU
31 32	140300 140345	12.45 165.2E 12.45 164.9E	PCN 6 PCN 6	T4.0/4.0 /D1.0/27HRS	ULAC 12.45 164.8E	PGTW KGWC
33 34	140600 140643	12.05 165.4E 12.55 164.2E	PCN 6		ULAC 12.15 164.2E	PGTW KGWC PGTW
31 32 33 35 35 37 39 39	141200	11.85 165.7E 11.25 166.0E 12.15 166.3E	PCN 6	T4.5/4.5 /D2.5/24HRS	ULAC 11.85 166.9E	PGTW KGWC
38 39	141600 141800	12.25 166.6E 12.35 166.7E	PCN 6		5U5 554 45 NV	PGTW PGTW
40	141914	11.95 166.5E 12.25 167.0E	PCN 2 PCN 3	TE E/E 5 /D1 5/24HPS	EYE FIX	PGTW KGMC
43	150000	12.25 167.4E 12.45 167.8E	PCN 2	T5.5/5.5 /D1.5/24HRS	EYE FIX EYE FIX	PGTW PGTW
45 46	150600 150613	12.45 168.3E 12.25 167.8E	PCN 2		EYE FIX	PGTW KGWC
47	150900 151127	12.65 168.3E 12.75 169.1E	PCN 2	T6.5/6.5 /D3.5/49HRS	EYE DIA .2 DEG	KGUC PGTU
50	151427	13.15 170.4E	PCN 2	TS.5/5.5 /D1.5/24HRS	EYE DIA 12 NM EYE DIA 40 NM	KGWC PGTW
50 51 52 53	151800 151853	13.65 170.9E 13.75 171.1E	PCN 2		EYE FÎX EYE DIA 15 NM	PGTW KGWC
54 55	152226	14.15 172.1E 14.35 172.3E	PCN 2	T6.5/6.5 /D1.0/24HRS	EYE DIA .2 DEG EYE FIX	KGWC PGTW
55 56 57 58 59	160323	14.95 172.9E 14.85 172.6E 15.25 173.5E	PCN 2	16,5/6.5 /D1.0/24HKS	EYE DIA .2 DEG EYE FIX	KGUC KGUC
59 60	160600	15.15 173.8E 15.75 174.5E	PCN 2 PCN 2			PGTU PGTU
60 61 63	160925 161107	15.75 174.0E 16.25 174.8E	PCN 2	T6.5/6.5 /S0.0/24HRS	EYE DIA .2 DEG EYE FIX	KGWC KGWC PGTU
64 65	161427 161600	16.85 175.5E 17.45 175.8E	PCN 2 PCN 2	(7.077.0-7D1.07E4NR3	EYE FIX EYE FIX	KGUC PGTW
66 67	161800 161832	17.85 176.1E 17.95 176.3E	PCN 2		EYE FIX EYE DIA 12 NM	PGTW KGWC
68 69	162100 162206	18.45 176.7E 18.65 176.8E	PCN 2 PCN 2	T6.0/6.5 /W0.5/24HRS	EYE DIA 12 NM	KGWC PGTW
71 72	170300	20.55 178.1E 20.85 177.6E	PCN 6			PĞTÜ KGWC
(4	1/0000	E1:33 1(0:4E	PCN 6	T5.5/6.5 /W1.0/27HRS	EYE FIX	KGWC PGTW
75 76 77	170900 170905	22.85 178.7E 23.05 178.3E	PUN 6	12.0/0.0 /#1.5/55442	EAE LIX	PGTU KGUC PGTU
78 79	171200 171416 171600	24.15 179.4E 25.65 179.6E 27.05 179.9W	PCN 6 PCN 6 PCN 6	T5.0/6.0 /W2.0/24HRS		KGWC PGTW
80 81	171800 171811	27.75 179.4W 27.95 179.8E	PCN 6 PCN 6			PGTW KGWC
* 82 83 84	172100 172146	29.35 178.2W 28.95 179.7W 28.95 178.3W	PCN 6 PCN 6 PCN 4	T3.5/4.5 /W2.5/24HRS	ULAC 29.35 178.8W EXP LLCC	PGTW KGWC PGTW
85 86	180000 180300 180301	28.95 178.3W 30.55 177.5W 30.75 178.0W 31.75 177.3W	PCN 4 PCN 6	T3.0/4.0 /W2.5/21HRS	EXP LLCC	PGTW KGMC
87 88	180509 180845	31.12 T.2.1M	PCN 6 PCN 6	T2.5/3.5 /W2.5/24HRS		KGMC KGMC
90 89	181405 182125	32.95 174.4W 34.65 173.1W	PCN 6			KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 31P BEST TRACK DATA

BEST TRACK	WARNING	24 HOUR FORECAST	48 HOUR FORECAST	72 HOUR FORECAST
0319962 13.7 138.3 25 0 0 0319182 14.1 139.1 30 0 0 0320062 14.2 139.8 40 14.0 2020182 13.8 139.5 50 14.0 2020182 13.6 138.9 60 13.5 20.0 2020182 13.6 138.9 60 13.5 20.0 2020182 13.6 138.9 60 13.5 20.0 2020182 13.5 138.8 90 13.5 20.0 2020182 14.5 20.0 2020182 14.5 20.0 2020182 14.5 20.0 2020182 15.2 138.5 120 15.5 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.2 138.5 120 15.5 20.0 2020182 15.1 12.5 25.0 0.0 2020182 15.6 112.4 30.0 0.0 2020182 15.6 112.4 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 112.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2020182 15.6 12.5 30.0 0.0 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 <td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td> POSIT UIND DST UI</td>	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	POSIT UIND DST UI
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERRO AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CY	-31114. 12 10 9 AL CYCLONE IS 2306. NM	R 72-HR URNG 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	ONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 31P FIX POSITIONS FOR CYCLONE NO. 31

NO.	TIME (Z)	POSITION	ACCRY	DVORAK CODE	INIT OBS ULCC FIX INIT OBS ULCC FIX INIT OBS ULAC 13.5S 137.0E ULAC 14.7S 138.3E ULAC 14.9S 138.1E ULAC 14.8S 137.6E INIT OBS ULAC 13.6S 140.5E ULAC 13.6S 139.9E ULCC FIX ULAC 13.2S 138.7E ULCC FIX ULAC 13.5S 138.7E ULAC 13.5S 138.7E EYE FIX	SITE
1	180600 181800	12.55 139.3E 13.25 138.9E	PCN 6	T1.0/1.0 T0.5/0.5	INIT OBS INIT OBS ULCC FIX	PGTW PGTW
4	190048	13.6S 137.2E	PCN 5	T1.5/1.5	INIT OBS ULAC 13.55 137.0E	PGTW KGWC
6 7	00008000000000000000000000000000000000	998200058587759695959595959595959595959595959595959	PCN 6	T2.0/2.0 /D1.0/24HRS		PGTW PGTW PGTW
* 9	191200	14.15 138.8E 14.25 137.5E	PCN 6		ULAC 14.75 138.3E	PGTW KGWC
* 11	191718	14.35 137.5E	PCN 6	T2.0/2.0 /D1.5/22HR5	ULAC 14.95 138.1E	PGTW KGWC
* 13 * 13	192051	14.45 137.8E	PCN 6		ULAC 14.8S 137.6E	PGTW KGWC
15 16	200058	14.75 138.5E	PCN 5	T2.5/2.5 /D1.0/24HRS		PGTW KGWC
17	200600	13.95 139.7E	PCN 6	12.5/2.5 /D0.5/22HR5		PGTW PGTW
18 19 20	200900	13.85 140.1E	PCN 6			PGTW
21 22	201200	13.95 140.4E	PCN 6	T2 . 5 / 2 . 5	INIT ORS 111 OC 12 CC 140 EF	PGTW
23 24	201600 201708	14.15 140.3E 14.05 138.7E	PCN 6	T3.0/3.0-/D1.0/24HRS	ULAC 13.65 139.9F	PGTU
1234567899	201800 202100	14.45 140.1E 14.35 139.2E	PCN 6 PCN 6		32.75 20,00 100,00	PGTŬ PGTU
28	202211	14.05 138.9E 13.95 138.6E	PCN 3 PCN 6		ULCC FIX	KGWC PGTW
30 31	210149	13.45 139.3E 13.55 139.0E	PCN 5 PCN 6	T3.5/3.5 /D1.0/25HRS T3.5/3.0 /D1.0/24HRS	ULAC 13.25 138.7E ULCC FIX	KGUC PGTW
35	210900	13.45 139.0E 13.55 138.6E	PCN 6			PGTW PGTW
34 35	211200	13.45 138.5E	PCN 6	T4 F 44 F 402 0 424100	ULAC 13.65 138.1E	KGWC PGTW
36 37	211600	13.75 138.4E	PCN 2	T4.0/4.0 /D1.0/24HRS	OLAC 13.55 138.7E	PGTW
38	211800	13.75 138.2E 13.25 138.7E	PCN 6			PGTW
39 40 41	220000	13.45 138.7E 13.35 138.9E	PCN 2 PCN 1	T5.0/5.0 /D1.5/24HRS	EVE FTY	PGTW
42 43	220600 220300	13.45 138.9E 13.75 138.8E	PCN 2 PCN 2	TS.0/5.0 /D1.5/24HRS	EYE DIA .5 DEG	PGTW
44 45	220848 220900	13.55 138.5E 13.75 138.8E	PCN 2		ĒÝĒ DĨÄ 24 NM EYE FIX	KGUC PGTU
46 47 48	221228	14.05 138.9E 13.95 138.8E	PCN 2	T6.5/6.5 /D2.0/24HRS	EYÊ FÎX Eye dia 18 mm	PĞTÜ KGUC
48 49 50	221600	14.45 138.9E	PCN 2	T5.5/5.5 /D1.5/24HRS	EYE FIX EYE FIX	PGTW KGWC
51	221646 221800 222100 222128	14.55 138.9E 14.7S 138.8E	PCN 2		EYE FIX	PGTW PGTW
52 53 54	230000	14.85 139.1E	PCN 2	T4 E (E A (IIA E (A (IIA)	EYE FIX	KGWC PGTW
55	230109	15.15 138.6E	PCN 2	T6.0/6.0-/D1.0/24HRS		KGWC PGTW
56 57 58	230600 230827 230900	15.25 137.9E	PC P		EYE DIA 18 NM	PGTW KGWC
59	231200	15.75 137.8E	PCN 6			PGTW PGTW

* 60 61	231208 15.45 137.2E 231600 15.75 137.6E 231635 15.55 137.5E 231800 15.55 137.5E 232100 15.55 137.5E 232100 15.55 137.6E 240040 15.65 137.6E 240048 15.75 136.9E 240600 15.45 136.4E 240900 15.25 136.1E	PCN S	T5.0/6.0 /W1.5/24HRS T6.0/6.0-/D0.5/24HRS	EYE FIX EYE FIX EYE FIX ULAC 15.2S 135.7E ULAC 15.3S 136.0E ULAC 15.8S 134.7E	KGWC
65	231635 15.75 137.6E	PCN 4 PCN 2	T6.0/6.0-/D0.5/24HRS	FUE ETV	PGTW
63	231800 15.55 137.5	PCN 4		ETE FIA	KGUC PGTU
64	232100 15.55 137.2E	PCN 4 PCN 6	T4.0/4.5 /W0.5/24HRS T4.5/5.5 /W1.5/26HRS		PĞTÜ
65 66	232107 15.55 137.5E 240000 15.65 137.0E	PCN 2			KGWC PGTW
67	240048 15.75 136.9F	PCN 1	T4 0/4 5 /U0 5/24U0S	EUE ETV	PGTW KGWC
68	240600 15.45 136.4E	PCN 4	T4.5/5.5 /W1.5/26HRS	EIE IIA	PGTW
69 70	240900 15.25 136.1E 240947 15.45 136.0E	PCH 4			PĞTÜ
71	241200 15.25 135.8E	PCN 2 PCN 6		EYE FIX	KGÚC PGTÚ
71 72 73 74	241200 15.25 135.8E 241329 15.15 135.4E	PCN 6		ULAC 15.25 135.7E	KGWC
73	241624 15.05 135.5E	PCN 6		ULAC 15.35 136.0E	ŔĠŨĊ
25	242046 14.95 133.7E 250000 14.85 134.6E	PCN 6 PCN 6 PCN 6 PCN 6		ULAC 15.8S 134.7E	KGWC
75 76	20220 14 40 124 00	PCN 5			PGTW KGWC
77	250510 14.35 134.5E	PCN 5			KGWC
78 79	250600 15.0S 134.2E 250900 15.4S 134.8E	PCN 5 PCN 6 PCN 6		III AA ETH	PGTW
20	250926 14.55 134.2E	066565656565656565656565656565656565656		DECC FIX	PGTU
81 82 83 84	251200 14.85 134.2E	PCN 6			POTU
-82	251309 14.55 134.1E 251600 14.55 133.5E	PCN 5			KĞÜĞ
84	251756 14.55 133.7E	PCN 5		III AC 15 38 134 65	PGTW
85	251800 14.45 133.3E	PCN 6		DEHO 13.33 134.6E	PGTII
86 87	260000 14.15 133.4E 260600 14.15 133.0E	PCN 6 PCN 6			ÞĞŤŴ
88	310300 13.45 121.8E	PCN 6	T1 .0/1.0	INIT ORC	PGTW
89	310600 13.35 121.5E	PCN 6		1111 003	PGTU
* 90 91	010000 14.85 117.7E 010310 14.95 115.7E	PCN 6 PCN 5 PCN 6	T2.0/2.0+/D1.0/21HRS		PĞTÜ
* 92	010600 15.85 113.1E	PCN 6	11.5/1.5	INIT OBS ULAC 15.55 114.6E	KGWC
* 93	010900 16.45 112.9E 011019 15.05 113.2E	PČN 6		ULCC FIX	PGTU
94 * 95	011019 15.0S 113.2E	PCN 6	E 0.00 0	ULAC 15.3S 111.3E	KĞÜÇ
* 95 96	011200 16.75 112.3E 011410 14.75 113.0E	PCN 5	T2.0/2.0	INIT OBS ULCC FIX	PGTW
97	011800 16.25 111 7E	PCN 6 PCN 6 PCN 5 PCN 6		DEHC 14.93 110.0E	POTU
98	011822 15.05 112.6E	PCN 6			KGUC
99 100	012100 15.25 112.25	00000000000000000000000000000000000000			PGTW
101	012300 14.95 112.2E 020000 14.85 112.2E	PCN 6	T2.0/2.0 /S0.0/24HRS		KGWC
102	020250 15.85 112.0E	PCN 5	T1.5/1,5 /S0.0/24HRS		KGUC
103 104	020300 15.25 110.5E 020600 15.55 110.2E	PCN 6 PCN 6			PGTW
105	020900 15.65 110.2E	PCN 6		III CC 19 AS 111 7E	PGTW
105 *106	020300 15.25 110.5E 020600 15.55 110.2E 020900 15.65 110.2E 020958 18.25 112.0E 021200 15.95 110.4E	PCN 6		ULAC 18.35 112.1E	KGHC
107	021200 15.95 110.4E	PCN 6	T1.5/2.0 /W0.5/24HRS	ULCC 19.45 112.4E	PGTŬ
*108 109	020300 15.25 110.5E 020300 15.25 110.2E 020900 15.55 110.2E 020900 15.55 110.2E 021200 15.95 110.4E 021349 19.25 112.0E 021349 19.25 110.9E 021600 16.55 110.9E	06656666666666666666666666666666666666		III CC 16 26 110 PE	KGUC
110	021800 15.55 110.0E	PČN 6		0000 10.60 110.60	PGTU
*111	022100 15.95 110.1E	PCN 6			PĞTÜ
112 113	022238 15.05 109.3E 030230 15.35 108.8F	PCN 5	T1 5/1 5 /80 0/24UDC	ULAC 15.55 109.8E	KGUC
114	022238 15.05 109.3E 030230 15.35 108.8E 030300 15.75 108.9E	PCN 6	(110,110 / 00,0/ETRN3	ULNU 18.85 188.6E	RGWC PGTH
115	031510 15.2S 104.9E	PCN 6 PCN 5 PCN 6 PCN 3 PCN 6	T0.5/1.5 /W1.0/24HRS	EXP LLCC	KĞÜĞ
116	040351 14.75 103.0E	PUN 6	TU.5/1.5 /W1.0/24HRS	ULCC 19.0S 111.7E ULCC 19.0S 111.7E ULCC 19.0S 111.7E ULCC 19.4S 112.4E	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 32P BEST TRACK DATA

0339122 13.8 148.3 45 13.6 1 03390022 13.8 147.3 55 14.0 1 03310022 13.8 146.3 60 13.9 1 0331002 13.8 145.3 60 13.9 1 0331102 13.8 145.3 60 13.9 1 0401002 14.0 143.3 45 13.8 1 0401122 14.4 142.6 30 14.0 1 0402002 14.8 141.8 20 14.0 1	0.0 0 -0 0 148.7 35. 41. 0. 147.7 45. 37. 0. 147.0 60. 21. 5. 146.0 60. 18. 0. 144.5 65. 47. 5. 144.3 65. 6. 10. 143.3 55. 12. 10. 142.3 25. 305.	0.0 0.0 00. 0. 14.3 146.6 60. 51. 5. 14.7 145.3 65. 79. 5. 14.8 145.0 65. 62. 51. 14.1 143.9 65. 29. 10. 13.9 144.5 55. 70. 10. 13.9 144.5 42. 10.	48 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 HOUR FORECAST ERRORS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL AVERAGE SPEED OF TROPICAL CYCL	ALL FORECASTS WRNG 24-HR 48-1 30. 66 82 16. 34. 55. 11. 15 4. 11. 9 10 9 9 CYCLONE IS 935. N LONE IS 6. K	HR 72-HR URNG	OONS WHILE OVER 35 KTS 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 32P FIX POSITIONS FOR CYCLONE NO. 32

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
123456789	271800 272100 280000 280109 280109 280822 280802 280800 281200	12.45 151.4E 13.05 151.5E 13.85 151.5E 14.05 151.7E 14.05 151.7E 11.35 152.6E 12.95 150.0E 11.95 152.4E	44444444 22222222 200000000000000000000	T1.0/1.0 T1.0/1.0 T2.0/2.0	INIT OBS ULCC FIX INIT OBS INIT OBS ULCC FIX ULCC FIX ULCC FIX ULCC FIX	PGTW PGTW PGTW KGWC PGTW KGWC PGTW PGTW

```
INIT OBS ULAC 13.05 150.0E
ULAC 13.0S 149.6E
                                                                                                                                                            T2.5/2.5
                                                         T2.0/2.0 /D1.0/24HRS
*
                                                                                                        ULAC 11.75 149.3E
ULCC 14.25 149.0E
                                                        T2.5/2.5 /D1.5/24HRS
T2.5/2.5 /D1.0/24HRS
                                                                                                        ULCC 13.9S 149.1E
ULAC 13.2S 147.9E
ULCC 13.7S 148.7E
ULAC 13.9S 148.0E
                                                        T3.0/3.0 /D0.5/24HRS
T3.0/3.0 /D1.0/18HRS
                                                                                                        ULAC 13.85 147.7E
                                                                                                        ULAC 13.8S 147.5E
                                                        T3.5/3.5-/D1.0/24HRS
T3.5/3.5 /D1.0/24HRS
                                                                                                        ULAC 13.65 146.9E
                                                                                                        ULAC 13.15 146.3E
*
                                                        T3.5/3.5 /D0.5/24HRS
T3.5/3.5-/D0.5/24HRS
                                                                                                        ULCC FIX
                                                                                                        ULCC FIX
                                                                                                        ULCC FIX
                                                        T4.0/4.0-/D0.5/24HRS
T3.5/3.5 /S0.0/24HRS
                                                                                                        ULAC 13.55 150.0E
*
                                                                                                        ULAC 12.85 144.8E
                                                                                                        ULCC FIX
                                                        T3.5/3.5-/$0.0/24HRS
T3.5/3.5 /$0.0/25HRS
*
                                                                                                        ULCC FIX
ULAC 11.8S 143.4E
ULCC FIX
ULCC FIX
                                                                                                        ULCC FIX
ULCC FIX
ULAC FIX
ULCC FIX
ULAC FIX
ULAC FIX
                                                                                                        SCNDRY LLCC 15.8S 142.3E
                                                        T2.0/2.0
                                                                                                        ULCC FIX
ULAC 15.0S 141.5E
INIT OBS
                                                        T0.0/0.0
                                                        T2.0/2.0 /S0.0/24HRS
T1.5/1.5
                                                                                                        INIT OBS
                                                        T1.5/1.5 /D1.5/24HRS
                                                        T2.0/2.0-/S0.0/24HRS
T1.5/1.5 /S0.0/24HRS
                                                                                                        EXP LLCC
```

SYNOPTIC FIXES

FIX	TIME	FIX	INTENSITY	NEAREST	COMMENTS
NO.	(Z)	POSITION	ESTIMATE	Data (NM)	

045

025

1 011100 14.0S 142.3E

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

91184

TROPICAL CYCLONE 335 BEST TRACK DATA

	BES	T TRAC	CK		WA	ARNING	ERRORS		24 1	HOUR F		AST RRORS		48 H	OUR F	ORECE	RRORS		72 H	OUR F	DRECAS	ORS
MO/DA/HR	POS.		WIND		SIT	WIND	DST WIND		SIT Ø.0	MĬWE) DS	T WIND		SIT	พรูก			9.0	0.0	WIND		MIND
0410122 0411002	11.5	72.8 71.2	25 35	0.0	0.0	Ø.	-0. 0. -0. 0.	0.0 0.0	ě.ě	ě:	-0. -0.	ø:	0.0	0.0	0.	-0.	ě:	0.0	0.0	0.	-0.	ø:
041112Z 041200Z	12.8 13.9	69.9 68.8	45 60	11.6	69.9 69.2	35. 50.	7210. 5910.	11.8	67.1 66.7	55. 70.	199. 160.	-20. -20.	12.2 15.6	64.3 64.0	65 . 85 .	319. 163.	-35. -25.	0.0 0.0	0.0	Ø. Ø.	-0. -0.	ø.
0412122 041300Z	15.1	67.4		15.0	67.4 65.8	65. 75.	610. 2915.	17.8	65.6	90. 80.	65. 110.	-10.	19.9	63.8 63.1	80. 70.	60. 344.	-20.	0.0	0.0	Ø.	-0. -0.	ø.
0413122	17.5	63.9	100	17.5	63.6	95.	175.	20.1	60.5	100.	195.	ø.	23.7	59.9	90.	421.	15.	0.0	0.0	ě:	-0.	ě:
041400Z 041412Z	18.2	63.2 63.7	110	18.3	62.7	105. 115.	295. 36. 15.	20.3	60.6 62.5	90. 95.	243. 239.		23.6 25.0	60.2 62.8	70. 80.	379. 553.	15. 40.	0.0 0.0	0.0	ø.	-0. -0.	ĕ:
041500Z 041512Z	18.4	64.4	90 75	19.0	64.1	100. 80.	40. 10. 29. 5.	19.9	65.7 63.3	80. 60.	319. 307.	25. 20.	21.9 20.2	68.5 64.5	60. 45.	759. 627.	30. 15.	0.0 0.0	0.0	e.	-0. -0.	0. 0.
041600Z	17.3	60.8	55	17.4	61.0	50.	135.	17.4	56.6	ãĕ.	78.	ø.	0.0	0.0	ø.	-ø.	ē.	0.0	0.0	ě:	-0. -0.	ě.
041612Z 041700Z	16.7 16.1	58.5 56.6	40 30	17.0	58.2 0.0	40.	25. Ø. -Ø. Ø.	0.0	0.0 0.0	ø.	-ø:	ø.	0.0	0.0	Ø.	-0.	ø.	0.0	0.0	ě:	-0.	ĕ:
041712Z 041800Z	15.3	54.8 52.8	30	0.0	0.0	ø	-0. 0. -0. 0.	0.0	0.0	Ø.	-0. -0.	Ø. Ø.	0.0	0.0 0.0	Ø.	-0. -0.	Ø.	0.0 0.0	0.0	Ø.	-0. -0.	ø.
041812Z 041900Z	15.4	50.4	25 20	0.0	9.0	e.	-e. e.	0.0	0.0	Ø.	-ø.	ø.	0.0	0.0	Ø.	-0.	0.	0.0	0.0	0. 0.	-0. -0.	Ø.

> TROPICAL CYCLONE 33S FIX POSITIONS FOR CYCLONE NO. 33

SATELLITE FIXES

FIX NO.	TIME (Z)	FIX POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3	100512 100857 101753	11.4S 73.2E 11.4S 72.2E 12.1S 72.1E	PCN 66 PCN 6	T1.0/1.0 T1.5/1.5 T2.5/2.5	INIT OBS ULAC 11.75 074.2E INIT OBS INIT OBS	KGWC FJDG
* 5678	273132782306712013356412913459388034348743634 5855513278230671201335564132913 10017122403333741122113155566131631311111111111111111111	EREFERENCE FREE FREE FREE FREE FREE FREE FREE FR	PCN 6 PCN 6 PCN 5 PCN 6 PCN 5	T2.5/2.5 /D1.5/25HRS T3.0/3.0 /D1.5/24HRS	COMMENTS INIT OBS ULAC 11.75 074.2E INIT OBS INIT OBS ULAC 12.05 071.7E ULAC 11.5S 071.5E EYE FIX EYE BIA 15 NM OPN SW ULAC 18.9S 063.7E ULAC 18.9S 064.9E ULAC 18.4S 064.3E ULAC 18.1S 064.5E ULAC 18.1S 064.5E ULAC 18.4S 064.5E ULAC 17.4S 064.6E EXP LLCC EXP LLCC EXP LLCC EXP LLCC INIT OBS ULAC 13.9S 054.4E	KGWC KGWC KGWC
9 10 11 12	111332 111733 112140 120212	12.55 68.9E 13.45 69.5E 13.75 69.1E 14.05 68.9E	₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	T3.5/3.5 /D1.0/24HRS		KGWC KGWC KGWC
13 14 15	120613 121026 121027	14.55 68.4E 15.15 67.4E 15.05 67.4E	PCN 1 PCN 2 PCN 6	T4.0/4.0 /D1.5/25HRS T3.5/3.5 /D0.5/24HRS	EYE FIX EYE FIX	KGWC KGWC
16 17 18 19	121712 121712 122130 130151	15.45 67.1E 15.65 66.6E 16.45 66.3E	PCN 2 PCN 6 PCN 8	T5.0/5.0 /D1.5/24HRS	EYE FIX EYE FIX	KGWC KGWC
20 21 22	130553 131015 131016	17.05 64.8E 17.25 64.1E 17.35 63.8E	PCN 2 PCN 2 PCN 5	T5.5/5.5 /D1.5/24HRS T5.0/5.0 /D1.5/24HRS	EYE DIA 12 NM EYE DIA 12 NM EYE FIX	KGWC KGWC FJDG
23 24 25 26	131431 131652 132119 140311	17.75 63.7E 17.75 63.4E 18.15 62.9E 18.25 63.5E	PCN 2 PCN 2 PCN 2	T6.0/6.0 /D1.0/24HRS	EYE FIX EYE FIX EYE FIX	KGWC KGWC KGWC
27 28 29	140533 141004 141005	18.55 63.5E 18.95 63.4E 19.05 64.0E	PCN 2 PCN 2 PCN 5	T6.0/6.0 /D0.5/24HRS T5.5/5.5 /D1.0/24HRS	EYE DÎÂ 15 NM EYE DÎA 15 NM OPN SW	KGWC KGWC
30 31 32	141409 141813 142108	18.85 63.4E 18.85 63.8E 18.85 64.2E	PCN 6 PCN 6 PCN 6	T4.5/5.5 /W1.5/24HRS	ULAC 18.95 063.7E ULAC 19.15 064.9E	KGUC KGUC KGUC
34 35 * 36	150654 150654 150954	18.25 64.5E 17.95 64.4E 17.55 64.0E	PCN 5 PCN 6 PCN 6	T4.0/5.0 /W2.0/24HRS	ULAC 18.65 064.3E ULAC 18.45 064.7E ULAC 18.15 064.5E	KGWC KGWC KGWC
37 38 39	151348 151753 160228	17.55 63.1E 17.75 62.0E 17.35 60.5E	PCN 6 PCN 6 PCN 4	T2.0/3.0 /W2.5/24HRS	ULAC 17.45 064.6E	KGWC KGWC
40 41 42	160633 161125 161733	17.05 58.9E 16.95 58.7E 16.55 59.2E	PCN 3 PCN 3 PCN 4	T2.0/3.0 /W2.0/24HRS	EXP LLCC EXP LLCC EXP LLCC	KGWC KGWC KGWC
0112745678901127456789011274567890112745678901	170613 171854 172218	15.85 56.1E 15.15 54.0E 14.45 53.9E	77665555655 122222222222222222222222222222	T1.0/2.0 /W1.0/23HRS T2.5/2.5	EXP LLCC INIT OBS ULAC 13.9S 054.4E	KGUC KGUC
47 48 49	180734 181103 181426	14.85 51.6E 15.25 50.4E 15.75 50.3E	PCN 5 PCN 6	T1.5/1.5 /D0.5		KGUC KGUC KGUC
50 51	181833 190714	16.4S 50.2E 17.9S 51.6E	PCN 5 PCN 5			KGUC KGUC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 345 BEST TRACK DATA

041218Z 12.0 131.3 45 11.8 13 041306Z 12.8 130.4 40 13.2 13 041318Z 13.8 129.8 35 14.8 18	ERRORS T WIND DST WIND POSIT 0.0 00. 0. 0. 0. 0. 13.7 35. 18. 0. 11.0 129. 12.6 45. 13. 0. 11.5 129. 10.9 55. 26. 10. 14.1 128.	50. 107. 5. 12.5 125.2 70. 280. 35. 55. 88. 15. 126.0 65. 183. 35. 65. 101. 30. 0.0 0.0 00. 0. 40. 115. 10. 0.0 0.0 00. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	72 HOUR FORECAST POSIT UIND DST UIND 0.0 0.0 0 -0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0 0.0 0.0 0 -0 0
AVG FORECAST POSIT ERROR AVG RIGHT ANGLE ERROR AVG INTENSITY MAGNITUDE ERROR AVG INTENSITY BIAS NUMBER OF FORECASTS DISTANCE TRAVELED BY TROPICAL CYCLO		TYPHOONS WHILE OVER 35 KTS WRNG 24-HR 48-HR 72-HR 0 0 0 0 0 0 0 0 0 0 0 0 0	

TROPICAL CYCLONE 34S FIX POSITIONS FOR CYCLONE NO. 34

SATELLITE FIXES

FIX NO.	TIME (2)	FIX POSITION	ACCRY	DVORA	CODE	C	OMMENTS.		SITE
1 2	090600 091200	9.85 143.9E 11.25 143.4E 10.85 143.4E	PCN 6 PCN 6	T1.0/:	L.0	INIT	OBS		PGTW PGTW
3 4	092100 100600	10.85 143.4E 11.15 142.0E	PCN 6 PCN 6	T1.0/:	L.0 /S0.0/24HRS				PGTW PGTW
567 89	101600 101800 102100	11.15 142.0E 10.65 137.3E 10.95 137.4E	PCN 6 PCN 6 PCN 6	T1.5/	1.5	INIT	085		PGTW PGTW PGTW
10	110000 110129 110300	10.55 136.5E 10.15 136.1E 10.95 136.0E 10.65 135.6E 10.75 135.5E	PCN 6 PCN 5 PCN 6	T1.5/ T2.0/	L.5 2.0 /D1.0/21HRS	INIT	OBS ULAC 10.65	135.7E	PĞTÜ KGUC PGTU PGTU
11 12 13	110828	10.75 135.5E 10.35 135.0E 10.55 135.1E	PCN 6 PCN 6 PCN 6			ULAC	10.15 134.7E		KGUC PGTU
12 13 14 15 16 17 18	110500 110828 110900 111200 111260 111634 111800	10.5S 134.7E 10.3S 133.3E 10.5S 134.3E 10.7S 133.8E 10.7S 134 1F	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T2.5/2 T2.5/2	2.5 2.5 /D1.0/22HRS	TINI	OBS		PĞTÜ KGWC PGTW KGWC PGTW
19		REPAIR R	PCN 6 PCN 6 PCN 5 PCN 6	T3.0/:	3.0 /D1.5/24HRS 3.0-/D1.0/24HRS	ULCC	FIX		PGTW KGWC PGTW KGWC PGTW
201233456789 222222222222222222222222222222222222	120520 120600 120900 120948 121200 121349	10.95 133.0E 11.05 132.5E 11.35 132.1E 11.65 132.8E	PCN 5 PCN 6 PCN 6 PCN 6 PCN 6 PCN 6			ULCC	FIX FIX		KGWC PGTW PGTW KGWC PGTW
* 29 30 31 32 33	121800 121805	11.65 132.8E 11.55 131.3E 12.25 130.8E 12.05 131.6E	PCN 6 PCN 6 PCN 5 PCN 5 PCN 5	T3.5/	3.5-/D1.0/26HRS				KGWC PGTW PGTW KGWC PGTW
34	122228	12.85 131.0E 12.55 130.6E	PCN 5 PCN 6			ULCC	FIX		KGWC PGTW
36 37 38 39	130049 130300 130509	12.85 130.3E 13.25 130.5E	PCN 6 PCN 6 PCN 6 PCN 5		•	ULCC	FIX		KGUC PGTW KGUC
46	130900	13.55 130.0E 13.75 130.4E	PCN 6			ULCC	FIX FIX		KGUČ PGTU PGTU
41 43 43	131200	13.75 130.2E 13.75 130.0E 14.25 130.7E	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		-	ULCC ULAC	FIX 14.95 130.8E		KGWC
* 45 46	131600 131755 131800 132100	14.85 130.3E 14.85 129.7E	PCN 5 PCN 6 PCN 6			ULCC	14.4S 129.8E		KGG PGGG PGGG PGGG PGGGG
* 47 * 48 * 49 * 50	132207	15.25 130.3E 15.35 129.8E	PCN 5 PCN 6			ULCC	FIX		PGTW
* 50 51 52 53	140600	14.85 129.76 15.05 129.8E 15.25 130.3E 15.35 129.8E 15.65 131.0E 14.05 129.4E 14.05 129.2E 14.15 127.5E	PCN 5 PCN 6 PCN 6 PCN 6	T0.0/	0.0 0.0 /50.0/18HRS	ULCC INIT EXP	15.5S 129.8E OBS EXP LLCC LLCC		KGWC PGTW PGTW PGTW
					RADAR FIXES				
FIX NO.	TIME (Z) PO	FIX DSITION RADAR	ACCRY S	EYE HAPE	EYE RADOB-CODE DIAM ASWAR TODER		ENTS	RADAR POSITION	SITE UMO NO.
12345678	121200 11. 121400 11. 122300 12. 130200 12. 130400 12. 130800 12. 131400 13.	85 138.9E LAND 65 131.7E LAND 55 130.4E LAND 65 130.4E LAND 75 130.0E LAND 85 130.2E LAND 85 129.8E LAND 129.8E LAND			40//0 42408 4///0 62087 45150 52611 5///2 5230 4//32 52411 45/// 7120 40/// 62116 45//2 72005			12.45 130.8E 12.45 130.8E 12.45 130.8E 12.45 130.8E 12.45 130.8E 12.45 130.8E 12.45 130.8E	94120 94120 94120 94120 94120 94120 94120
		-			SYNOPTIC FIXES	^			
FIX NO.	TIME (Z) P(FIX INTEN DSITION ESTIM	SITY NEARE	ST (NM)	COMMENT	rs			
1	140000 14	.0S 129.5E 03	5 62	0	UMO 94111				

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

TROPICAL CYCLONE 355 BEST TRACK DATA

	BEST TRAC	ĸ		WARNING		RORS		24 (HOUR F	ORECA	ST RORS		48 H	IOUR !	FORECA	ST RORS		72 H	OUR F		RORS
MO/DA/HR	POSIT	MIND	POSIT	MINI		MIND	PO	SIT	WINI) P(DSIT	WIN		MIND	POS	IT:	WIND	DST	WIND
041206Z	8.8 100.3	35	9.0 100		21.		10.1	96.2	ŠŜ.	177.	5	11.7	92.5	70.	517.	5.	0.0	0.0	0.	-0.	ø.
0412182	9.2 99.0	45	9.2 98		30.		10.3	94.6	65.	339.	Š.	12.2	91.1	80.	705.	10.	0.0	0.0	ø.	-0.	0.
041306Z	10.1 99.2	50	9.5 99	4 55	38.		10.0	98.5	65.	211.	ē.	11.1	96.8	80.	572.	20.	0.0	0.0	0.	-0.	0.
0413182	11.1 100.3		10.9 99.		26.			100.5	75.	182.	Š.	13.9	99.1	85.	518.	30.	0.0	0.0	0.	-0.	Θ.
041406Z	12.2 101.3		11.8 101.	3 65.	24.	ē.		103.1	75.	160.	15.	17.3	103.7	85.	314.	35.	0.0	0.0	ø.	-0.	ø.
041418Z	14.2 103.0	70 1	14.0 102	8 70.	17.	ø.	17.2	105.5	90.	104.	35.	20.0	108.5	100.	105.	60.	0.0	0.0	Θ.	-0.	0.
041506Z	15.5 105.5	60 1	15.3 105.	3 70.	17.	10.	17.7	109.8	70.	75.	20.	19.6	113.5	75.	162.	45.	0.0	0.0	ø.	-0.	0.
041518Z	17.4 107.3	55 1	17.0 107.	3 50.	24.			110.2	40.	60.	0.	23.4	112.8	30.	335.	ø.	0.0	0.0	ø.	-0.	ø.
041606Z	18.7 109.0	50 1	19.2 109.	5 45.	41.	-5.	23.5	112.8	35.	309.	5.	0.0	0.0	0.	-0.	ø.	0.0	0.0	Θ.	-0.	0.
041618Z	19.1 110.1	40 1	19.6 110		31.	-5.	20.7	111.9	25.	167.	-5.	0.0	0.0	0.	-0.	ø.	0.0	0.0	ø.	-0.	ø.
041706Z	18.7 110.8	30 1	19.3 110.	9 30.	36.	0.	0.0	0.0	ø.	-0.	0.	0.0	0.0	0.	-e.	0.	0.0	0.0	ø.	-ø.	ø.
041718Z	18.2 110.6	30	0.0	00.	-0.	ø.	0.0	0.0	ø.	-0.	ø.	0.0	0.0	0.	-0.	ø.	0.0	0.0	ø.	-0.	e.
041806Z	17.8 110.3	30	0.0	0 0.	-0.	ø.	0.0	0.0	0.	-0.	0.	0.0	0.0	₽.	-e.	ø.	0.0	0.0	ø.	-0.	ø.
0418182	17.5 110.0	25	0.0 0	0 0.	-0.	ø.	0.0	0.0	Θ.	-0.	0.	0.0	0.0	Θ.	-e.	e.	0.0	0.0	ø.	-0.	Θ.

| ALL FORECASTS | UNNG | 24-HR | 48-HR | 72-HR | URNG | 24-HR | 48-HR | URNG | 24-HR

TROPICAL CYCLONE 355 FIX POSITIONS FOR CYCLONE NO. 35

SATELLITE FIXES

FIX NO.	TIME	POSITION	ACCRY	DVORAK CODE	COMMENTS	SITE
1 2 3	101200 101600 101800	8.85 109.3E 8.65 107.2E 8.55 106.9E 9.05 106.3E 9.25 105.7E	PCN 6 PCN 6 PCN 6	T1.0/1.0	INIT OBS	PGTW PGTW PGTW
4 5	102100	9.05 106.3E 9.25 105.7E	PCN 6	T1.5/1.5 /D0.5/30HRS		PGTW PGTW
6 7 8 9 10 11 12	112100 120250 120300 120600 120702 120900 121129	9.95 104.9E 9.25 1001.2E 8.75 100.3E 8.65 1001.2E 9.95 99.8E	065665666 077777777777777777777777777777		INIT OBS ULAC 09.35 101.9E INIT OBS ULCC FIX ULCC FIX ULAC 09.25 102.1E ULCC FIX ULAC 09.45 099.5E INIT OBS ULAC 09.25 099.5E	PGTUC PGGUU PGGUU PGGUU KGGUU KGGUC
12 13 14	121200 121531	9.05 99.4E 9.05 99.9E	PČN 6	T3.0/3.0	INIT OBS ULAC 09.25 099.5E	PGTW KGWC
15. 16 17 18	121600 121803 121947 122100	9.05 99.0E 9.05 98.7E 9.25 99.6E 9.35 98.6E	PCN 6 PCN 6 PCN 6	T3.0/3.0 /D1.5/24HRS	ULAC 09.35 099.2E	PGTW KGWC PGTW
90127456789012	130000 130009 130300 130411 130600 130833 130834 130900	9.35 9.55 9.55 9.55 10.25 99.5E 10.45 99.4E 10.45 99.3E		T3.5/3.5-/D1.0/24HRS T2.5/2.5 /D1.0/25HRS T1.5/1.5	ULAC 09.65 098.8E ULAC 09.65 098.8E ULAC 09.65 099.4E ULAC 09.65 099.7E ULAC 10.25 098.7E INIT 085	KGUU KGUU PGUU PGUU FJII PGU
27 28 29 30		11.05 99.1E 10.65 99.5E 11.15 99.8E 11.15 99.9E	PCN 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	T3.5/3.5 /D0.5/24HRS T4.0/4.0 /D1.0/22HRS		PGTW KGWC PGTW
31 32 33 34 35	131800 131932 132100 132348 140000	10.65 99.5E 11.15 99.8E 11.15 99.9E 11.15 100.6E 11.15 100.8E 11.15 101.3E	PCN 6		ULAC 11.05 100.4E ULAC 11.15 100.4E	KGWC PGTW KGWC PGTW
35 36 37	140000 140300 140352	11.45 100.8E 11.65 101.1E 11.55 101.5E 11.95 101.4E 12.75 101.6E	PCN 6 PCN 6 PCN 6	T3.5/3.5 /D1.0/24HRS	ULAC 11.35 101.3E	PGTW KGWC
38 39 40	140600 140822	11.95 101.4E 12.55 101.6E	PCN 6 PCN 6	T4.0/4.0 /D0.5/27HRS	ULAC 11.3S 101.3E ULAC 13.1S 100.9E	PGTW KGWC
41	140823 141047 141200	13 15 101 /E	PCN 5 PCN 6 PCN 6		HLAC 12.65 101.9E	FJDG KGWC PGTW
42 43 44 45 46 47	141450 141600 141800 141926 142100	13.45 102.3E 14.25 103.2E	PCN 6 PCN 6 PCN 6 PCN 6 PCN 6 PCN 6	T3.0/3.5 /W0.5/24HRS T4.5/4.5 /D0.5/24HRS	ULAC 13.45 103.1E	KGWC PGTW PGTW KGWC PGTW KGWC
44555555555555555555555555555555555555	142327 150000 150300 150331 150600 150811	14.35 103.0E 14.35 103.6E 14.35 103.6E 14.35 104.8E 14.85 104.9E 14.85 104.3E 15.35 105.8E 15.35 106.0E	PCN 6 PCN 6 PCN 6 PCN 6	T4.0/4.0-/50.0/21HRS T3.0/3.5 /W0.5/23HRS	ULCC 15.15 105.2E ULAC 16.15 105.6E ULCC FIX ULCC FIX EXP LLCC ULAC 17.95 107.4E	PGTW PGTW
54 55 56	150900 151200 151439	16.85 106.9E	PCN 6 PCN 6 PCN 6 PCN 6	T2.5/3.0 /W0.5/24HRS	ULCC FÎX EXP LLCC ULAC 17.95 107.4E	PĞTÜ KĞWÇ
5? 58 59 60	151915 152336 160311	17.65 108.0E 18.45 108.2E 18.65 109.0E	PCN 6 PCN 3 PCN 6		EXP LLCC ULAC 19.15 108.9E EXP LLCC ULAC 19.45 109.6E EXP LLCC ULAC 20.35 109.4E	
61 62	160801	18.75 109.3E 19.05 108.8E 18.75 109.7E	PCN 4 PCN 6		EXP LLCC ULAC 20.3S 109.4E EXP LLCC	KGWC PGTW KGWC
63 64 65 66	161004 161200 161410 161600	19.25 109.9E 19.25 109.9E 18.65 109.4E	PCN 4 PCN 6 PCN 6	T1.5/2.0 /W1.0/24HRS	EXP LLCC	PGTW KGWC PGTW
67 689 70 71 72	162100 162244 170000 170250 170600	18.65 109 4E 19.55 110 5E 18.85 110 6E 18.85 110 6E 18.75 110 6E 18.95 110 9E 18.75 110 9E 18.75 110 9E	PCN 4 PCN 4 PCN 4 PCN 3 PCN 6	T1.5/2.5 /W1.5/24HRS	EXP LLCC EXP LLCC EXP LLCC EXP LLCC EXP LLCC EXP LLCC	KGUC PGTW KGUC PGTW KGWC PGTW
73 74 75 76	170750 170900 171349 180000	18.75 110.9E 17.95 110.5E 18.05 110.5E	PCN 6 PCN 4 PCN 4		EXP LLCC EXP LLCC EXP LLCC	KGWC PGTW PGTW
77 78 79 80 81	180230 180600 181511 181600 181800	17.75 110.0E 17.85 110.1E 17.85 110.5E 17.45 110.1E 17.55 110.0E	PCN 3 PCN 4 PCN 4 PCN 6 PCN 6	T1.0/1.5 /W0.5/24HRS T1.0/1.0	EXP LLCC INIT OBS	KGWC PGTW KGWC PGTW PGTW PGTW
823 834 856	190000 190300 190351 190600 191450	17.45 109.8E 17.45 110.4E 17.45 110.4E 18.15 110.8E 17.75 112.6E	PCN 4 PCN 3 PCN 4 PCN 6	T1.0/1.0 /D1.0/24HRS T1.0/1.0 /S0.0/24HRS	EXP LLCC EXP LLCC EXP LLCC ULAC 17.5S 111.2E ULAC 18.1S 113.8E	PGTW KGWC PGTW KGWC
86 87	200331	18.65 111.6E	PCN 5	T1.0/1.0 /S0.0/24HRS	ULAC 18.15 113.8E ULAC 18.45 114.5E	KGWC

NOTICE - THE ASTERISKS (*) INDICATE FIXES UNREPRESENTATIVE AND NOT USED FOR BEST TRACK PURPOSES.

APPENDIX I DEFINITIONS

<u>HEST TRACK</u> - A subjectively smoothed path, versus a precise and very erratic fix-to-fix path, used to represent tropical cyclone movement.

<u>CENTER</u> - The vertical axis or cone of a tropical cyclone. Usually determined by wind, temperature, and/or pressure distribution.

<u>CYCLONE</u> - A closed atmospheric circulation rotating about an area of low pressure (counter-clockwise in the Northern Hemisphere).

<u>EPHEMERIS</u> - Position of a body (satellite) in space as a function of time; used for gridding satellite imagery. Since ephemeris gridding is based solely on the predicted position of the satellite, it is susceptible to errors from vehicle pitch, orbital eccentricity, and the oblateness of the earth.

<u>EXPLOSIVE DEEPENING</u> - A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5 mb/hr for 12 hrs or 5.0 mb/hr for six hrs (ATR 1971).

EXTRATROPICAL - A term used in warnings and tropical summaries to indicate that a cyclone has lost its "tropical" characteristics. The term implies both poleward displacement from the tropics and the conversion of the cyclone's primary energy sources from release of latent heat of condensation to baroclinic processes. The term carries no implications as to strength or size.

EYE - A term used to describe the central area of a tropical cyclone when it is more than half surrounded by wall cloud.

<u>FUJIWHARA EFFECT</u> - An interaction in which tropical cyclones within about 700 nm (1296 km) of each other begin to rotate about one another. When intense tropical cyclones are within about 400 nm (741 km) of each other, they may also begin to move closer to each other.

MAXIMUM SUSTAINED WIND - Highest surface wind speed averaged over a one-minute period of time. Peak gusts over water average 20 to 25 percent higher than sustained winds.

RAPID DEEPENING - A decrease in the minimum sea-level pressure of a tropical cyclone of 1.25 mb/hr for 24 hrs (ATR 1971).

<u>RECURVATURE</u> - The turning of a tropical cyclone from an initial path toward the west or northwest to a path toward the northeast.

<u>RIGHT ANGLE ERROR</u> - The distance described by a perpendicular line from the best track to a forecast position. (See Figure 4-1).

SIGNIFICANT TROPICAL CYCLONE - A tropical cyclone becomes "significant" with the issuance of the first numbered warning by the responsible warning agency.

SUPER TYPHOCN/HURRICANE - A typhoon/hurricane in which the maximum sustained surface wind (one-minute mean) is 130 kt (67 m/s) or greater.

TROPICAL CYCLONE - A non-frontal low pressure system of synoptic scale developing over tropical or subtropical waters and having a definite organized circulation.

TROPICAL CYCLONE AIRCRAFT RECONNAISSANCE

COCRDINATOR - A USCINCPACAF representative designated to levy tropical cyclone aircraft weather reconnaissance requirements of reconnaissance units within a designated area of the PACOM and to function as coordinator between USCINCPACAF, aircraft weather reconnaissance units, and the appropriate typhoon/-hurricane warning center.

TROPICAL DEPRESSION - A tropical cyclone in which the maximum sustained surface wind (one-minute mean) is 33 kt (17 m/s) or less.

TROPICAL DISTURBANCE - A discrete system of apparently organized convection - generally 100 to 300 nm (185 to 556 km) in diameter - originating in the tropics or subtropics, having a non-frontal migratory character, and having maintained its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field. As such, it is the basic generic designation which, in successive stages of intensification, may be classified as a tropical depression, tropical storm or typhoon (hurricane).

TROPICAL STORM - A tropical cyclone with maximum sustained surface winds (one-minute mean) in the range of 34 to 63 kt (17 to 32 m/s) inclusive.

TROPICAL UPPER-TROPOSPHERIC TROUGH (TUTT) - A dominant climatological system (upper-level trough), and a daily synoptic feature, of the summer season over the tropical North Atlantic, North Pacific and South Pacific Oceans.

TYPHOON/HURRICANE - A tropical cyclone in which the maximum sustained surface wind (one-minute mean) is 64 kt (33 m/s) or greater. West of 180 degrees longitude they are called typhoons and east of 180 degrees they are called hurricanes. Foreign governments use these or other terms for tropical cyclones and may apply different intensity criteria.

<u>VECTOR ERROR</u> - The distance described by a straight line from the forecast position to the position at verification time as found on the best track. (See Figure 4-1).

<u>WALL CLOUD</u> - An organized band of cumuliform clouds immediately surrounding the central area of a tropical cyclone. The wall cloud may entirely enclose or only partially surround the center.

APPENDIX II NAMES FOR TROPICAL CYCLONES

Column 1	Column 2	Column 3	Column 4
ANDY	ABBY	ALEX	AGNES
BRENDA	BEN	BETTY	BILL
CECIL	CARMEN	CARY	CLARA
DOT	DOM	DINAH	DOYLE
ELLIS	ELLEN	ED	ELSIE
FAYE	FORREST	FREDA	FABIAN
GORDON	GEORGIA	GERALD	GAY
HOPE	HERBERT	HOLLY	HAL
IRVING	IDA	IAN	
			IRMA
JUDY	JOE	JUNE	JEFF
KEN	KIM	KELLY	KIT
LOLA	LEX	LYNN	LEE
MAC	MARGE	MAURY	MAMIE
NANCY	NORRIS	NINA	NELSON
OWEN	ORCHID	OGDEN	ODESSA
PEGGY	PERCY	PHYLLIS	PAT
ROGER	RUTH	ROY	RUBY
SARAH	SPERRY	SUSAN	SKIP
TIP	THELMA	THAD	TESS
VERA	VERNON	VANESSA	
	· =		VAL
WAYNE	WYNNE	WARREN	WINONA

NOTE:

Names are assigned in rotation, alphabetically. When the last name (WINONA) has been used, the sequence will begin again with "ANDY".

Source: CINCPACINST 3140.1 (series)

APPENDIX III

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and the second s	NOAN HYDROMETEOROLOGY BR, SILVER SPRINGS, MD (1)
CIVIL DEFENSE, SAIPAN (1)	NOAA/ACQUISITION SECTION ROCKVILLE, MD (1)
CNO (OP-952), WASHINGTON DC (1)	NOAA/NESDIS, REDWOOD CITY, CA (1)
COLORADO STATE UNIV (3)	NOAA/PMEL, SEATTLE, WA (1)
COLORADO STATE UNIV (LIBRARY) (1)	NOCD, AGANA (3)
COMFAIRECONRON ONE (1)	NOCD, ALAMEDA (1)
COMMONWEALTH OF NORTHERN M.I., SAIPAN (5)	NOCD, ASHEVILLE (2)
COMNAVAIRSYSCOM (1)	NOCD, ATSUGI (1)
COMNAVFACENGOOMPACDIV (1)	NOCD, BARBERS POINT (1)
COMNAVMARIANAS (2)	NOCD, DIEGO GARCIA (20
COMPAVOCEANCOM (2)	NOCD, KADENA (1)
COMNAVSURFGRU WESTPAC (2)	
COMNAVSURFPAC (3)	NOCD, MONTEREY (1)
COMPHIBGRU ONE (1)	NPGS DEPT OF MET (3)
COMSC (1)	NPGS LIBRARY (1)
COMSEVENTHELT (1)	OCEAN ROUTES INC, CA (2)
	OCEANO SERVICES INC, CA (1)
COMINIROFLIT (1)	OFFICE OF THE NAVAL DEPUTY, NOAA (1)
COMUSNAVPHIL (1)	OKINAWA MET OBS (1)
CONGRESSIONAL INFORMATION SERVICE, MD (1)	OLG/HQ AWS/CARCAH, NAT HURRICANE CENTER (5)
DEFENSE COMMUNICATIONS AGENCY, GUAM (1)	PACAF/DOW (2)
DEFENSE DOCUMENTATION CENTER (12)	PACIFIC STARS AND STRIPES (1)
DEPT OF AIR FORCE (1)	PAGASA, RP (5)
	PENNSYLVANIA STATE UNIVERSITY (1)
DEPT OF COMMERCE (2)	
DET 2, 20 WS (1)	ROYAL OBSERVATORY, HONG KONG (5)
DET 4, 20 WS (1)	SECDEF, PENTAGON (2)
DET 5, 20 WS (2)	TAIWAN UNIVERSITY (1)
DET 8, 20 WS (2)	TEXAS A and M UNIVERSITY (1)
DET 10, 30 WS (1)	TYPHOON COM SECR, MANILA (2)
DET 15, 30 WS (1)	INTECCAD BANCKOK (2)
DDI 13/ 30 MD (1/	CREACAT, DRIVING (2)
	UNESCAP, BANGKOK (2) UNIVERSITY OF CHICAGO (1)
DET 17, 20 WS (1)	UNIVERSITY OF CHICAGO (1)
DET 17, 20 WS (1) DET 18, 30 WS (1)	University of Chicago (1) University of Hawaii Dept of Met (3)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1)	University of Chicago (1) University of Hawaii Dept of Met (3) University of Hawaii (Library) (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5)	University of Chicago (1) University of Hawaii Dept of Met (3) University of Hawaii (Library) (1) University of Philippines (5)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMOCEANCEN, MONTEREY (2)	University of Chicago (1) University of Hawaii Dept of Met (3) University of Hawaii (Library) (1) University of Philippines (5) University of Washington (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEET OF MET (3) UNIVERSITY OF HAWAII (LIERARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEET OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEET OF MET (3) UNIVERSITY OF HAWAII (LIERARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEET OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMOCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELIATION (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMOCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1) USS ENTERPRISE (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUCHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ AWS/DNT (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS KITTY HAWK (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ ANS/DOR (2) HQ ANS/DOR (1) HQ USAF/XOORZ (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CONSTELLATION (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMOCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DOT (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS LONG BEACH (2) USS MIDWAY (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ ANS/DOR (2) HQ ANS/DOR (1) HQ USAF/XOORZ (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CONSTELLATION (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMOCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ AMS/DOT (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCIPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DOR (2) HQ AWS/DOR (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2) INSTITUO DE GEOFISICA, MEXICO (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CALL VINSON (1) USS CONSTELLATION (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUCHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DNT (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TAIWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CORTELLATION (1) USS CORTELLATION (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1) USS RANGER (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ ANS/DNT (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TAIWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CORTLIATION (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1) USS RANGER (1) USS TARAWA (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ ANS/DOR (2) HQ ANS/DOR (2) HQ ANS/DOR (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2) INSTITUD DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2) KOTSCH, W.J., RADM (RET) (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CONSTELLATION (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1) USS RANGER (1) USS TARAWA (1) USS TARAWA (1) USS TARAWA (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DOR (2) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TAIWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2) KOTSCH, W.J., RADM (RET) (2) LOS ANGELES PUBLIC LIBRARY (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CONTELLATION (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1) USS RANGER (1) USS TARAWA (1) USS TARAWA (1) USS TRIPOLI (2) WEATHER SERV MET OBS, AGANA (2)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DOR (2) HQ AWS/DOR (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2) KOTSCH, W.J., RADM (RET) (2) LOS ANGELES PUBLIC LIBRARY (1) MAC/HO, IL (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CORAL SEA (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS RANGER (1) USS TAIRGER (1) USS TRIPOLI (2) WEATHER MODIFICATION PROGRAM OFFICE (1)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DNT (1) HQ USAF/XOORZ (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2) KOTSCH, W.J., RADM (RET) (2) LOS ANGELES PUBLIC LIBRARY (1) MARATHON OIL COMPANY, TX (2)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CONSTELLATION (1) USS CONTELLATION (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS OKINAWA (1) USS RANGER (1) USS TARAWA (1) USS TARAWA (1) USS TRIPOLI (2) WEATHER SERV MET OBS, AGANA (2)
DET 17, 20 WS (1) DET 18, 30 WS (1) ENVIR SVCS DIV, PENTAGON (1) FAA, GUAM (5) FLENUMCEANCEN, MONTEREY (2) FLORIDA STATE UNIV., TALLAHASSEE (2) GEOLOGICAL SURVEY, GUAM (1) GFDL, PRINCETON, N.J. (1) GUAM PUBLIC LIBRARY (5) HUGHES AIRCRAFT COMPANY (1) HQ AWS/DOR (2) HQ AWS/DOR (2) HQ AWS/DOR (1) INDIA MET DEPT (3) INST OF PHYSICS, TALWAN (2) INSTITUO DE GEOFISICA, MEXICO (1) JAPAN MET AGENCY (3) JASDF, TOKYO (2) KOTSCH, W.J., RADM (RET) (2) LOS ANGELES PUBLIC LIBRARY (1) MAC/HO, IL (1)	UNIVERSITY OF CHICAGO (1) UNIVERSITY OF HAWAII DEPT OF MET (3) UNIVERSITY OF HAWAII (LIBRARY) (1) UNIVERSITY OF PHILIPPINES (5) UNIVERSITY OF WASHINGTON (1) USCINCPAC (1) USS BELLEAU WOOD (1) USS CARL VINSON (1) USS CORAL SEA (1) USS CORAL SEA (1) USS ENTERPRISE (1) USS ENTERPRISE (1) USS KITTY HAWK (1) USS LONG BEACH (2) USS MIDWAY (1) USS NEW ORLEANS (1) USS RANGER (1) USS TAIRGER (1) USS TRIPOLI (2) WEATHER MODIFICATION PROGRAM OFFICE (1)
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TROPICAL CYCLONE BEST TRACK DATA
TROPICAL CYCLONE FORECASTING
AIRCRAFT RECONNAISSANCE
DYNAMIC TROPICAL CYCLONE MODELS
TYPHOON ANALOG MODEL
TROPICAL CYCLONE STEERING MODEL
CLIMATOLOGY/PERSISTENCE TECHNIQUES
TROPICAL CYCLONE FIX DATA



The dense white wall cloud of Super Typhoon Dot contrasted with the thin cirrus overhead, as seen across the left wing of the 54th Weather Reconnaissance Squadron WC-130 aircraft. At 1600002 October 1985, the time of this picture, Dot had just reached super typhoon intensity. Dot became the most intense tropical cyclone of the 1985 northwest Pacific season with maximum sustained surface winds of 150 kt (77 m/s) (photo provided by the pilot and photographer Major Barry B. Besold).